



National Park Service
U.S. Department of the Interior
Tumacácori National Historical Park
Arizona

Fire Management Plan

Environmental Assessment / Assessment of Effect

July 2015



Fire Management Plan

Environmental Assessment/Assessment of Effect

Summary

Tumacácori National Historical Park currently follows the 2004 *Fire Management Plan* to guide its wildland fire program. In the past, national park system units could use the 2003 Healthy Forest Initiative Categorical Exclusion to be in compliance with National Environmental Policy Act (NEPA) requirements. However, based on reinterpretation of policy in response to recent case law, the decision was made in 2008 to discontinue use of the 2003 Healthy Forest Initiative Categorical Exclusion for compliance with NEPA, and to use a different NEPA pathway. This Environmental Assessment has been prepared in support of a revised Fire Management Plan.

This Environmental Assessment (EA) evaluates two alternatives: the no action alternative and an action alternative. The no action alternative describes suppression of wildfire, with no planned fuel reduction projects due to the lack of a valid Fire Management Plan. The action alternative allows for implementation of a range of fire management activities. These activities and treatments would be centered on public and firefighter safety, communities identified as at risk from wildfires (wildland-urban interface), current condition class, and collaboration with other agencies and stakeholders. These activities would be part of potential fuels treatments such as prescribed burns, mechanical fuels reduction (using things such as chainsaws, loppers, mowers, chippers), or in response to wildfires. Fire management actions could include use of mechanical treatments around buildings, utilities, cultural resources and in the wildland-urban interface adjacent to private property, as well as prescribed burning and pile burning.

This EA has been prepared in compliance with the National Environmental Policy Act (NEPA) to provide the decision-making framework that 1) analyzes a reasonable range of alternatives to meet objectives of the proposal, 2) evaluates potential issues and impacts to the Park's resources and values, and 3) identifies mitigation measures to lessen the degree or extent of these impacts. Resource topics are included in this document because the resultant impacts may be greater than negligible, and includes: geology and soils, hydrology/water quality, vegetation, special status species, archeological resources, and historic structures. All other resource topics were dismissed because the proposed action would result in no effects or negligible effect to those resources. No major effects are anticipated as a result of the proposed action. Public scoping was conducted to assist with the development of this document and comments were received, mostly in support of the proposed project.

Public Comment

If you wish to comment on the environmental assessment, you may post comments online at <http://parkplanning.nps.gov/tuma>, or mail or hand delivered comments to the name and address below. This environmental assessment will be available for public review for 30 days. Before including your address, phone number, e-mail address, or other personal identifying information in your comment, you should be aware that your entire comment – including your personal identifying information – may be made publicly available at any time. Although you can ask us in your comment to withhold your personal identifying information from public review, we cannot guarantee that we will be able to do so. Comments will not be accepted by fax, email, or in any other way than those

specified above. Bulk comments in any format (hard copy or electronic) submitted on behalf of others will not be accepted.

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Table of Contents

CHAPTER 1: PURPOSE AND NEED.....	1
Introduction.....	1
Background.....	1
Purpose and Need.....	3
General Management Considerations	3
Relationship to Other Plans and Policies.....	7
Scoping	8
Impact Topics Retained for Further Analysis	8
Impact Topics Dismissed from Further Consideration.....	8
CHAPTER 2: ALTERNATIVES.....	13
No-Action Alternative.....	13
Action Alternative: Fire Management Plan with Limited Fuels Management Activities.....	14
Mitigation Measures.....	15
Environmentally Preferable Alternative	21
Preferred Alternative	22
CHAPTER 3: AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES.....	23
Cumulative Impact Scenario	24
Geology and Soils.....	26
Hydrology/Water Quality	28
Vegetation	31
Special Status Species.....	35
Impacts to Cultural Resources and Section 106 of the National Historic Preservation Act ...	39
Archeological Resources.....	39
Historic Structures	43
CHAPTER 4: CONSULTATION/COORDINATION.....	49
Internal Scoping	49
Public Scoping	49
Agency Consultation.....	49
Native American Consultation.....	50
Environmental Assessment Review and List if Recipients.....	50
List of Preparers	50
CHAPTER 5: REFERENCES.....	51

List of Tables

Table 1. Methods Each Alternative Uses to Ensure Each Objective Is Met	17
Table 2. Comparison of Alternatives.....	19
Table 3. Summary of Impacts by Alternative	19
Table 4. Geology and Soils Impact Intensity Thresholds.....	27
Table 5. Hydrology/Water Quality Intensity Thresholds	29
Table 6. Vegetation Impact Intensity Thresholds	32
Table 7. Special Status Species Impact Intensity Thresholds.....	37
Table 8. Archeological Resources Impact Intensity Thresholds.....	44
Table 9. List of Classified Structures.....	44
Table 10. Historic Structures Impact Intensity Thresholds.....	44
Table 11. Document Preparers	50

List of Figures

Figure 1. Map of the three units of Tumacácori National Historical Park	2
Figure 2. Vegetation Communities of Tumacácori National Historical Park	31

CHAPTER 1: PURPOSE AND NEED

INTRODUCTION

Tumacácori National Historical Park is located in Santa Cruz County, Arizona, 18 miles north of the city of Nogales and the United States-Mexico border, and 43 miles south of Tucson (see figure 1). The park protects three Spanish colonial mission ruins in southern Arizona: Mission San José de Tumacácori (Tumacácori), Mission Los Santos Ángeles de Guevavi (Guevavi), and Mission San Cayetano de Calabazas (Calabazas). Tumacácori, Guevavi, and Calabazas are units of Tumacácori National Historical Park. The three units combined total 360 acres; the Tumacácori unit is the largest. These missions are among more than twenty established in the *Pimería Alta* by Father Eusebio Francisco Kino, a Jesuit missionary, and other Jesuits in the 17th and 18th centuries, and later expanded by Franciscan missionaries. Tumacácori was first established in 1691, and a Jesuit church was started at the present location in 1753. The Franciscan Order arrived in 1768 and continued building and remodeling. All three units of Tumacácori were vacant by 1848.

In September 1908, a presidential proclamation established Tumacácori National Monument to preserve “the Tumacácori Mission, an ancient Spanish ruin. . .” The original proclamation established a park area of 9.11 acres. A second proclamation in 1958 enlarged the national monument by 0.15 acres. The National Parks and Recreation Act of 1978 revised the authorized boundary of the national monument, adding 6.37 acres and removing 0.13 acres. In August 1990, Public Law 1001-344 changed the designation of the park from national monument to national historical park by combining the existing monument with two associated Spanish colonial sites located south of Mission San José de Tumacácori: Los Santos Ángeles de Guevavi (Guevavi), established in 1691, and San Cayetano de Calabazas (Calabazas), established in 1756. An additional 310 acres, including a one-mile stretch of the Santa Cruz River and adjacent riparian area, gallery forest, and mesquite bosque, were added to the national historical park in 2004, resulting in a total area of 360 acres.

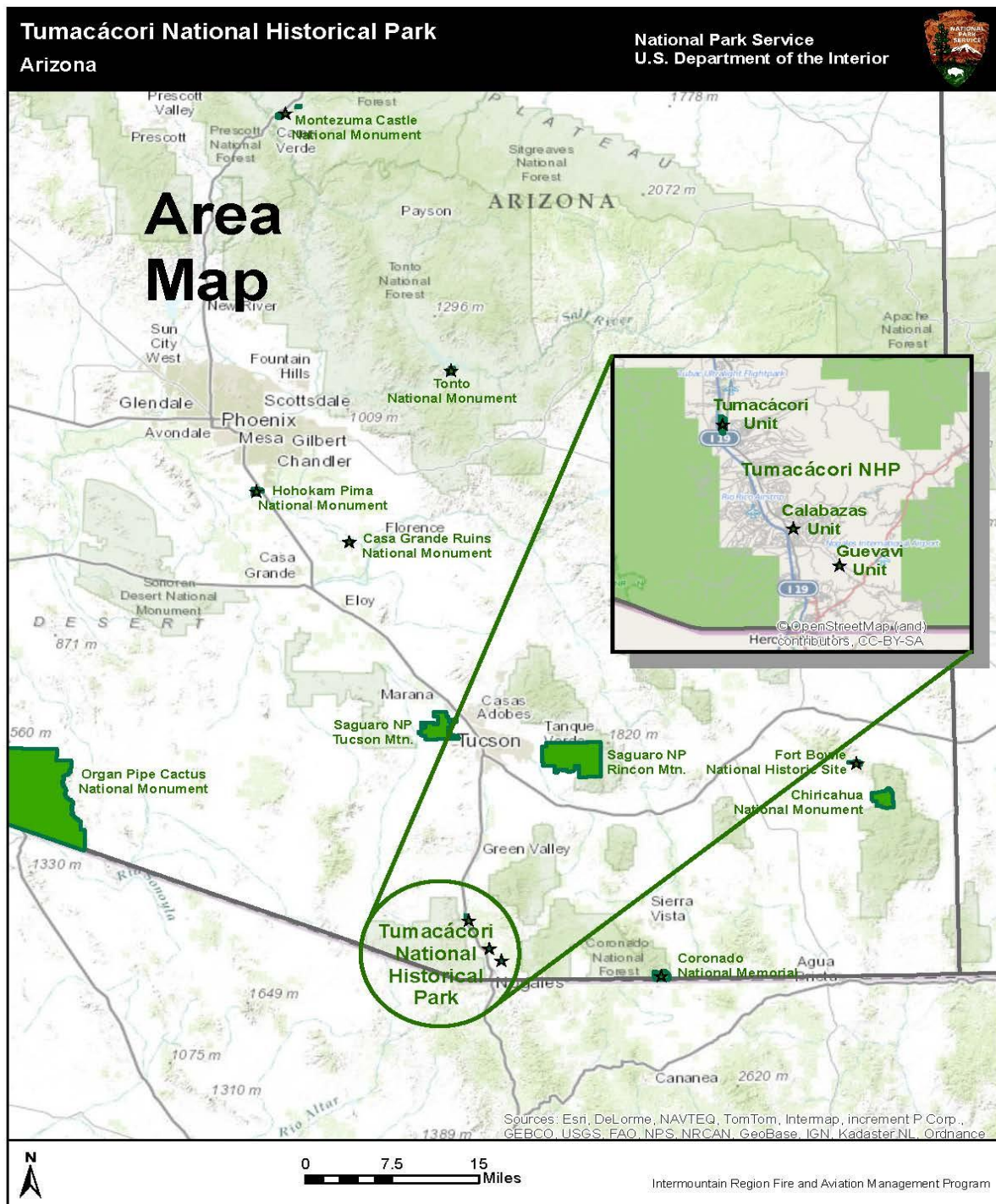
BACKGROUND

Residents of the area dating back to the 1920s do not recall any wildland fires at the park or near the river. Most of the area has been impacted by human activities, including irrigated farming. Two human-caused fires have burned within the park in recent years: the Mission Fire in 2008 and the Apache Fire in 2009. In 2011 the Murphy Fire burned near the park.

Located within the semi desert climatic zone of southern Arizona, the park experiences two distinct periods of precipitation annually: the winter (November through April) storms that move into the State from the Pacific Ocean, and the summer (July through September) monsoon season bringing storms that enter mainly from the Gulf of Mexico. On average, about half of the annual precipitation, between 8 and 18 inches, falls from July through September. Relative humidity decreases steadily from January until July, and then rapidly increases until the end of the monsoon season in September. May is the driest month. The area's long hot season lasts from April through October. The maximum temperatures average more than 90°F from May through September, with the average maximum temperature at times in excess of 100°F in July. Intense surface heating during the day and active radiational cooling at night can result in daily average temperature ranges of 30 to 40°F. Diurnal winds tend to follow the Santa Cruz Valley, blowing downslope (from the south) during the

night and early morning, and upslope (from the north) during the day. Wind has an average annual speed of about eight miles per hour and blows mostly from the southeast.

Figure 1. Map of the three units of Tumacácori National Historical Park



The park's fire season is approximately April through September. These dates may change to early or late spring and winter depending on the overall Southwest weather patterns.

PURPOSE AND NEED

Tumacácori National Historical Park currently follows the 2004 *Fire Management Plan* to guide its wildland fire program. In the past, national park system units could use the 2003 Healthy Forest Initiative Categorical Exclusion to be in compliance with National Environmental Policy Act requirements. The Healthy Forest Initiative Categorical Exclusion was codified in Interim Guidance Director's Order #12 Categorical Exclusions on May 22, 2009. The reference for this Categorical Exclusion under Director's Order #12 guidance is 3.4 G, 1. However, based on reinterpretation of policy in response to recent case law, the decision was made to discontinue use of the 2003 Healthy Forest Initiative Categorical Exclusion (2008) for compliance with the National Environmental Policy Act.

This environmental assessment for the fire management plan will bring the park into compliance with Director's Order #18 and National Environmental Policy Act requirements and allow Tumacácori National Historical Park to continue implementing the applicable fire management programs. Potential impacts of the no-action alternative and preferred alternative on park resources are described in Chapter 3.

GENERAL MANAGEMENT CONSIDERATIONS

The park's fire management program seeks to safely and effectively manage wildland and prescribed fires, while providing for the protection of life, property, and the park's natural and cultural resources. This includes use of the survivable space concept. Survivable space is the area around a house or other building where the vegetation has been managed to reduce fire intensity as a wildfire nears and to keep fire from reaching the structure. This reduces the chances of it burning, even without firefighters being there to help defend it. The program's aim is to recover, maintain, increase, or facilitate the interaction of native ecosystem processes in an effort to restore and perpetuate the native diversity, resiliency, resistance, and sustainability of the park's natural environments. The program is based on the most up-to-date scientific research and monitoring, and considers past and present human disturbances and effects on the natural and cultural environment. The fire program is also based on the adaptive management concept and therefore implements deliberate and measurable actions that are monitored to determine if the conditions produced are favorable, sustainable, and maintain or improve ecosystem health.

Wildland Fire Management Goals

1. Provide the means for staff and the public to preserve protect, understand, and enjoy the natural and cultural resources of the park through an integrated program where management activities support naturally functioning ecosystems consistent with cultural resource preservation needs.
2. Educate, inform, consult, collaborate, and maintain cooperative fire planning with other land agencies, landowners, and local communities.
3. Achieve ecologically sustainable vegetative conditions across broad vegetation communities by restoring a natural range of variability and biodiversity.

4. Identify and mitigate hazards related to the wildland-urban interface through coordination and collaboration with neighboring agencies and landowners over time and across boundaries.

The following fire management objectives support these goals:

Objective #1: Protect life, property, and the park's natural and cultural resources from the effects of wildfire.

- Give primary consideration to firefighter, employee, and public safety and provide for the safety of the park's visitors, neighbors, and employees during all phases of fire management operations.
- Conduct all fire management activities commensurate with applicable laws, policies, and regulations.
- Suppress all wildfires in the park.
- Efficiently use available resources to suppress wildfires.
- Use prescribed fire and/or mechanical treatments to reduce the risk of property damage due to wildland fire and to provide for human safety and resource protection.
- Create survivable space zones around structures and developed areas in the park and in the wildland-urban interface by using mechanical treatments and/or prescribed fire to clear vegetation and reduce continuity of fuels.
- Implement a cooperative fire prevention program to eliminate human-caused wildfires.
- Identify sensitive natural and cultural resources, and develop mitigation plans that provide for the preservation and protection of the park's natural and cultural resources.

Objective #2: Prevent or mitigate impacts due to fire suppression activities.

- Use Minimum Impact Suppression Tactics and rehabilitate disturbed areas to protect and mitigate impacts on the park's natural, cultural, and scenic resources.
- Ensure that a resource advisor is present and/or consulted on all major fire program activities.
- Inform and train firefighters about the impacts of fire suppression on the park's sensitive natural and cultural resources.
- Avoid the use of non-native seed to rehabilitate sites disturbed by wildland fires or their suppression.

Objective #3: Institute and maintain a Fire Information and Education Program.

- Conduct wildland fire prevention, information, education, and other activities in communities within and abutting the park, working in collaboration with local communities and county, state, and federal agencies with fire management interests.
- Educate employees and the public about the scope and effect of wildland and prescribed fire management, including fuels management, smoke management, resource protection, fire

prevention, hazard/risk assessment, mitigation, rehabilitation, the wildland/urban interface problem, and the role of fire in ecosystem management.

- Emphasize interagency communications for fire management activities, such as job training, sharing of staff, sharing of resources, and evaluation of fire management actions and activities.
- Maintain relationships with the Native American community and encourage their participation in the management of traditional gathering areas.
- Collaborate with county and state air resources agencies to monitor smoke levels and manage smoke-related effects on visitors, residents, and employees.

Objective #4: Use prescribed fire to meet fire and resource management goals and objectives.

- Where applicable, restore fuel loads and plant community structure and composition to ranges of natural variability comparable to pre-Anglo settlement using a predetermined regimen of management-ignited prescribed fires.
- Use management ignited prescribed fires to reduce fuels and minimize the occurrence of unnaturally intense wildland fires.
- Include fire and resource management objectives specific to each prescribed fire in the prescribed fire burn plan.
- Avoid prescribed fires that would reduce air quality below federal, state, and local standards.
- Train the park's staff and cooperators to conduct safe, objective-oriented prescribed fires consistent with Director's Order #18 requirements.
- Ensure that a resource advisor is present or consulted on all prescribed fires.
- Institute and maintain a Fire Ecology Program that, at a minimum, utilizes the National Park Service's Fire Monitoring Handbook and current software to ensure that fire effects are monitored, recorded, and evaluated for all prescribed fires in the park.

Wildland Fire Management Options

Fire Suppression: All wildfires will be suppressed in the park. Tactics for suppression are varied and depend on the particular situation (e.g., location, weather, safety considerations, etc.) for each individual wildfire. Suppression actions can include hand crews constructing a line around the fire perimeter to remove live and dead vegetation that could fuel the fire; water and retardant drops from aircraft; mechanical thinning; "burn out" situations in which fire is used to remove live and dead vegetation in an effort to stop the fire; and "cold trailing" in areas of low fuel loads, where crews physically feel the ground and put out "hot spots."

In areas with sensitive natural or cultural resources, Minimum Impact Suppression Tactics are used and/or resource advisors are consulted.

Prescribed Fire: Prescribed fires are intentionally lit by trained, qualified fire managers under predetermined conditions to meet fire and resource management goals and objectives. Prescribed fires include pile burning, where vegetation is cut and moved to a central location and burned, or broadcast burning, where fires are ignited within a predefined area and allowed to move through the vegetation within those boundaries. All environmental compliance must be met prior to any fire

ignition and a written and approved prescribed fire plan must exist. Within the prescribed fire plan are detailed prescription parameters that must be followed.

Non-fire Fuel Treatments: Non-fire fuel treatments include various methods of mechanical thinning (such as use of chainsaws, axes, and loppers). In general, thinning involves removing live and dead vegetation (fuels) according to a prescribed plan to meet specific objectives related to fuels management. Thinning is also used as a pre-treatment for prescribed burning to remove smaller diameter trees, ladder fuels, shrubs, snags, and ground litter to help keep the fire within the designated area or to protect specific resources. When multiple burns are needed to reduce levels of fuels, thinning pre-treatments can expedite the process by several years. Thinning is also used in suppression actions and as an effective treatment to reduce fuels in the wildland-urban interface. All environmental compliance must be met prior to any fire ignition and a written and approved prescribed fire plan must exist.

Adaptive Management: Adaptive management is generally considered to be the process of continually adjusting management strategies in response to new information, knowledge, or technologies. Adaptive management is a process for implementing management decisions that requires monitoring of management actions and adjustment of decisions based on past and present knowledge. Adaptive management applies scientific principles and methods to improve management decisions incrementally as experience is gained and in response to new scientific findings and societal changes.

The adaptive management cycle begins with developing a plan that articulates the project's goals, objectives, and strategies. The plan is then implemented, and the actions and responses are monitored. The results of this monitoring are evaluated to determine if the actions were appropriate and achieved the stated goals and objectives, or if a change in action or method is necessary to meet objectives.

If the adaptive management process leads to a change in actions, existing NEPA must be reviewed to ensure that the changes are within its scope. If the change would be outside that scope, new analysis and NEPA compliance must be completed prior to implementation.

Fire Ecology Program: In order to use prescribed fire on National Park Service lands, a Fire Ecology Program must be in place. This vegetation monitoring program uses the best available information (such as data collected on-site, scientific journals, and knowledge from resource specialists) to formulate realistic objectives for desired future resource conditions. Involving the park staff at many levels, as well as local scientists from universities or cooperating/neighborhood agencies, is important to this process. Once desired future resource conditions are agreed upon, specific and measurable objectives are written, a desired degree of certainty in the results is determined, and vegetation sampling protocols are established and implemented. After the data has been collected, it is used to evaluate if fire and resource management objectives are being met and to determine if additional research is needed. If unexpected trends are identified, objectives may need to be revised and/or the program reevaluated. When this information is used to reevaluate program goals or objectives, the adaptive management process is implemented.

The over-riding goals and objectives of the Fire Ecology Program are to:

- Use an adaptive management approach to work with resource and fire managers to identify resource management challenges, desired future conditions, and monitoring objectives for vegetation types to be treated with prescribed fire.

- Record basic fire behavior and weather information for all prescribed fires.
- Establish and implement a sampling design and data collection protocol for each vegetation community to be treated with prescribed fire.
- Document and analyze short and long-term fire effects on vegetation.
- Use all available information to determine if fire and resource management objectives are being met.

Identify where or if additional fire effects research is needed. **Fire Monitoring:** Monitoring of all fires, including suppression fires, prescribed fires, and appropriate management responses involves the systematic collection and recording of data on fuels, topography, weather, air quality, and fire behavior. At a minimum, monitoring at the park follows the protocols outlined in the National Park Service Fire Monitoring Handbook. This fire behavior and weather information is broadcast over radios to all fire personnel during the fire event and then later provided to fire managers in a report. All prescribed fire monitors are trained and certified in both basic fire behavior and prescribed fire monitoring techniques.

RELATIONSHIP TO OTHER PLANS AND POLICIES

Tumacácori National Historical Park General Management Plan / Environmental Assessment (2013). Tumacácori National Historical Park developed a general management plan to replace a previous plan, providing long-term goals and objectives for resource management, visitor experience and educational opportunities, and facility development. The park worked closely with federal, state, and local agencies, tribes, and the general public to identify common interests and goals for the park. The selected alternative will focus on engaging visitors, park neighbors, and partners in the history and outstanding natural and cultural resources found at all three park units, although activities will be concentrated at the Tumacácori unit. The Fire Management Plan environmental assessment is consistent with the general management plan in that all wildland fire suppression and fuels treatments would avoid or minimize effects to natural resources and cultural resources, and all actions put the safety of the public and employees as the primary consideration.

The National Park Service's *Management Policies 2006* and Director's Order #18 require that "each park with vegetation capable of burning will prepare a fire management plan to guide a fire management program that is responsive to the park's natural and cultural resource objectives and to safety considerations for park visitors, employees, and developed facilities" (NPS 2006). Parks with an approved fire management plan and accompanying National Environmental Policy Act compliance may use wildfire to achieve resource benefits in predetermined fire management units; however, as Tumacácori National Historical Park is within the Sonoran Desert, where vegetation is sensitive to fire, managed fire use is not anticipated. Parks lacking an approved fire management plan may not use resource benefits as a primary consideration influencing the selection of a fire suppression strategy, but they must consider the resource impacts of fire suppression alternatives in their decisions (NPS 2006).

The 2014 Interagency Standards for Fire and Fire Aviation Operations (Red Book) states that the Superintendent will "ensure applicable park resource management objectives are included in Fire Management Plan (FMP)." The activities defined in the fire management plan will be implemented in accordance with agency and departmental policy, including procedural updates contained in the following (but not limited to) documents:

- Interagency Prescribed Fire Planning and Implementation Procedures Guide (November 2013)
- Interagency Standards for Fire and Fire Aviation Operations (January 2014)
- Guidance for Implementation of Federal Wildland Fire Management Policy (February 2009).

This environmental assessment has been prepared in accordance with the National Environmental Policy Act and its implementing regulations, 40 Code of Federal Regulations Parts 1500-1508; National Park Service Director's Order #12, *Conservation Planning, Environmental Impact Analysis, and Decision-making*; and Section 106 of the National Historic Preservation Act of 1966 as amended, and its implementing regulations in 36 Code of Federal Regulations Part 800.

SCOPING

On November 17, 2010, an interdisciplinary team meeting was convened to initiate the preparation of an environmental document in support of the fire management plan. Park significance, legislative intent, park purpose and mission statement were discussed in the meeting. At that time, the interdisciplinary team developed the purpose and need statement, goals and objectives, issues, and preliminary proposed alternatives related to the fire management plan. A public scoping meeting was held at the park, and a letter regarding the project was sent to interested parties. See Appendix A for a summary of scoping efforts.

IMPACT TOPICS RETAINED FOR FURTHER ANALYSIS

Issues and concerns affecting the proposed action were identified by specialists in the National Park Service. Impact topics are the resources of concern that could be affected by the range of alternatives. Specific impact topics were developed to ensure that alternatives were compared on the basis of the most relevant topics. The following impact topics were identified on the basis of federal laws, regulations, orders, and National Park Service *Management Policies*, 2006.

- Geology and soils
- Hydrology/water quality
- Vegetation
- Special status species
- Archeological resources
- Historic structures

IMPACT TOPICS DISMISSED FROM FURTHER CONSIDERATION

The National Park Service defines “measureable” impacts as more than minor effects. It equates “no measureable effects” as negligible or less effects. “No measureable effect” is used by the National Park Service in determining if a categorical exclusion applies or if impact topics may be dismissed from further evaluation in the environmental assessment. The use of “no measureable effects” in this environmental assessment pertains to whether the National Park Service dismisses an impact topic

from further detailed evaluation. The reason the National Park Service uses “no measurable effects” to determine whether impact topics are dismissed from further evaluation is to concentrate on the issues that are relevant to the action in question rather than amassing needless detail, in accordance with Council on Environmental Quality regulations at 1500.1(b).

Some impact topics were dismissed from further evaluation in this environmental assessment if:

- They do not exist in the analysis area, or
- They would not be affected by the proposal, or the likelihood of impacts are not reasonably expected, or
- Through the application of mitigation measures, there would be negligible or less effects (i.e., no measurable effects) from the proposal, and there is little controversy on the subject or reasons to otherwise include the topic.

These impact topics include prime and unique farmlands, wetlands and floodplains, wildlife, night sky, air quality and soundscapes, scenic resources, wilderness, visitor use and experience, cultural landscapes, ethnographic resources, transportation, museum collections, environmental justice, and socioeconomics. Because the alternatives would have no measurable effect on these topics, these topics have not impact on cumulative effects.

WETLANDS AND FLOODPLAINS

There are no true wetlands within Tumacácori. Mesic riparian environments and floodplains occur along the Santa Cruz River within the park. While treatments may take place on the floodplains of the river, no treatments would impact the function of the floodplains. Appropriate mitigation measures would be implemented to minimize potential effects to these resources, and the impacts would be negligible. Therefore wetlands and floodplains were dismissed as impact topics. Impacts to the hydrology/water quality of the Santa Cruz River corridor are analyzed in Chapter 3 of this document.

VISITOR USE AND EXPERIENCE

Visitors could temporarily be denied access to the park during fire suppression activities. Although visitors would not be able to experience the park resources, visitor health and safety would be protected. Since these impacts would be temporary and irregular, they are considered negligible and are not addressed.

WILDLIFE

Wildlife species may be temporarily displaced by fire management activities, while crews are actively working in the park. Following completion of the projects, wildlife would readily move back into the area. There could be a short-term loss of habitat from wildfires, however the mesic soil conditions in the riparian area would allow for rapid recovery of much of the habitat. No planned fire management activities would result in impacts to the riparian gallery forest. Impacts to wildlife species would be negligible to minor and adverse in the short-term from displacement and loss of habitat. Long-term impacts would be negligible to minor and beneficial as planned activities would help maintain native plant species and habitats. Impacts to special status wildlife species are analyzed.

SCENIC RESOURCES

For all alternatives wildfire would be suppressed, so long-term impacts to the landform, vegetation, and cultural components of scenery would be negligible. Fires would dominate some views; however, this would be localized and herbaceous and shrubby vegetation would recover quickly. Impacts to the cottonwood gallery forest from wildfires would be visible for the long-term. Overall, impacts would be negligible to minor and are not analyzed in detail.

NIGHT SKY

The park is usually open for day use only, so the impacts of light, smoke, and particulates from temporary wildfire are expected to be negligible, thus this impact is not addressed.

AIR QUALITY AND SOUNDSCAPES

Fuels reduction techniques and wildfire suppression activities would result in negligible impacts to air quality. The impacts would be very short-lived and localized. The impacts to soundscapes would be negligible given the setting. Tumacácori is adjacent to Interstate 19 and adjacent farming activities. Any impacts from fire management actions would be very short-lived and localized. Therefore, these topics have been dismissed from further analysis.

TRANSPORTATION

There are no public roads in the park. There may be temporary closure of the adjacent Old Tucson/I-19 frontage road during fire suppression activities; however, such closures would be very infrequent and would not substantially impinge on local transportation. Therefore, this impact topic is dismissed from further analysis.

WILDERNESS

Neither Tumacácori National Historical Park nor adjacent lands are proposed or designated as wilderness; therefore, this impact topic is dismissed from further analysis.

PRIME AND UNIQUE FARMLANDS

According to U.S. Department of Agriculture's Natural Resources Conservation Service, no soils in the park are classified as prime and unique farmlands. Thus, this impact topic of prime and unique farmland is not addressed.

SOCIOECONOMICS

The proposed action would neither change local and regional land use nor appreciably impact local businesses or other agencies; therefore, this impact topic is dismissed from further analysis.

ENVIRONMENTAL JUSTICE

The proposed action would not disproportionately affect low-income or minority communities; therefore, this impact topic is dismissed from further analysis.

CULTURAL LANDSCAPES

According to the NPS's Director's Order 28 *Cultural Resource Management Guideline*, a cultural landscape is a reflection of human adaptation and use of natural resources, and is often expressed in the way land is organized and divided, patterns of settlement, land use, systems of circulation, and the types of structures that are built. The park contains three cultural landscapes: Tumacácori itself, and the two other missions: Calabazas and Guevavi. Elements of the identified cultural landscape at Tumacácori do not include the riparian area along the Santa Cruz River or the mesquite bosque, because they were not used during the historic period for which the cultural landscape is significant. The proposed action would restore adjacent areas to more natural conditions and reduce the risk of damaging wildfires. All activities will be conducted in such a manner as to avoid impacting currently designated and potential cultural landscapes. Therefore, this topic has been dismissed from further consideration. Pursuant to 36CFR800.5 (these regulations implement the National Historic Preservation Act and address the criteria of effect and adverse effect) the National Park Service finds that implementation of projects and mitigation measures in the fire management plan for Tumacácori National Historical Park would result in a "no adverse effect" determination for cultural landscapes eligible for or listed on the National Register of Historic Places.

ETHNOGRAPHIC RESOURCES

Both the no-action and proposed action alternatives would have no effect on known ethnographic resources. Project-specific tribal consultation will be completed to ensure that no adverse impacts will occur. Therefore, this impact topic is dismissed from further analysis.

MUSEUM COLLECTIONS

Both the no-action and proposed action would not affect museum collections, because collections and exhibits are housed in structures that are maintained with fire-wise fuel reduction standards, and will be protected during wildfires. Therefore, this impact topic is dismissed from further analysis.

CHAPTER 2: ALTERNATIVES

The no-action alternative and the proposed action alternative were developed by the staff of Tumacácori National Historical Park and the Fire Management Office at Saguaro National Park. Each alternative addresses specific management objectives and are feasible for local implementation. Alternatives that did not meet these criteria were eliminated from further analysis. In compliance with the National Environmental Policy Act, this environmental assessment evaluates the potential effects of alternative strategies found in the fire management plan for Tumacácori National Historical Park.

Under both alternatives, all three units of the park would be considered a single fire management unit. Within this unit, fire management activities may occur throughout the park or be concentrated in areas with vegetation. The containment of invasive plants following fire would be focused on areas where fire management activities occurred, but would not be restricted to those areas.

Under both alternatives, all wildfires will be suppressed in a prompt, safe, and cost-effective manner to protect firefighter safety and to minimize damage to resources. The fire management plan does not differentiate between human- and lightning-caused fires and all ignitions would be suppressed in the safest and most appropriate manner. Due to the park's small size, high historic value, and prevalence of non-fire adapted plant species, achieving resource benefits from wildfire is prohibited in the fire management plan.

Minimum impact management philosophy guides the selection of fire management actions. Park staff would manage wildland fires in ways that minimize unnecessary impacts to resources and convey the importance of this strategy to all fire management forces. Minimum impact management strives to minimize landscape alteration and disturbance to natural and cultural resources while safeguarding human lives and accomplishing resource-related objectives. Without compromising safety, firelines would be located where they do the least damage, minimize tree cutting, and use natural firebreaks when possible. Staging areas would be placed with park resources in mind in order to avoid or minimize impact. Agency resource advisors would be consulted prior to implementing management tactics.

Despite the best intentions of minimum impact management, wildland fire actions often create the need for short-term or long-term rehabilitation. Staff would consult with resource managers to determine short-term and long-term needs and evaluate the need to write rehabilitation plans for each fire. Common rehabilitation recommendations include flush-cutting stumps, brushing in firelines, removing all trash, installing erosion control devices, and monitoring non-native invasive species.

ALTERNATIVES CARRIED FORWARD

Under both of the alternatives carried forward for analysis, the park would implement a cooperative fire prevention program to reduce human-caused wildfires. Park employees or collaborators would conduct wildland fire prevention, information, education, and other activities in communities within and abutting the park, working in collaboration with local communities and county, state, and federal agencies with fire management interests. The park would educate employees and the public about the scope and effect of wildland and prescribed fire management, including fuels management, smoke management, resource protection, fire prevention, hazard/risk assessment, mitigation, rehabilitation, the wildland/urban interface problem, and the role of fire in ecosystem management.

The park will strive to maintain relationships with the Native American community and encourage their participation in the management of traditional gathering areas.

NO-ACTION ALTERNATIVE

Under the no-action alternative, the park would not perform hazardous fuels treatments, including thinning or prescribed burning. Under this alternative all wildland fires would receive fire suppression response commensurate with values to be protected and human safety. Firefighters with hand tools, and in some situations with mechanized equipment, would be assigned to suppress all fires. The fire suppression strategy could include fire line construction using hand tools, chainsaws, and water hose lines. The use of chemical retardants would require the superintendent's approval. Off-road vehicle use could be permitted on a case-by-case basis and would be preapproved by the superintendent or a park resource advisor.

Under the no-action alternative, pile burning of invasive plant species may be initiated under separate NEPA documentation. Mechanical thinning on the park's boundary could not be conducted under this alternative.

Since the development of the fire management plan in 2004 the park has conducted thinning around structures, herbicide applications, pile burning of invasive species (National Environmental Policy Act compliance documentation was completed as part of a separate invasive plant management plan; NPS 2008a), and has maintained firebreaks on park boundaries through mechanical thinning. Though these activities have been done in the past, under the no-action alternative these fire management tools would not be available except for those permitted under the park's invasive plant management plan.

ACTION ALTERNATIVE: FIRE MANAGEMENT PLAN WITH LIMITED FUELS MANAGEMENT ACTIVITIES

Under this alternative, the National Park Service would implement limited fuels management activities. These activities and treatments would be centered on public and firefighter safety, communities at risk from wildfires (wildland-urban interface), and collaboration with other agencies and stakeholders. These activities would be part of potential fuels treatments including prescribed burns and mechanical treatments (using equipment such as chainsaws, chippers, and loppers). Fire management actions would include minimizing wildland fire by using mechanical and herbicide treatments (use of this vegetation treatment tool is permitted via the park's invasive plant management plan) around buildings, utilities, infrastructure, and cultural resources. Prescribed burning could be used for achieving vegetation management goals such as removing vegetation debris from small areas for agricultural use or for restoration. Pile burning could also be used to eliminate woody debris and reduce fuels.

Due to the small size of the park and the proximity to private property, the importance of its cultural resources, and the sensitivity of the native plant communities to fire, all wildfires would be suppressed. The exact nature of that response may vary, based on firefighter and public safety, and values to be protected. Fuels treatments under this alternative would assist suppression activities by improving firefighter access and mitigating hazardous fuel situations.

MITIGATION MEASURES

Mitigation measures are actions designed to reduce or eliminate adverse effects of the proposed action to park resources. These mitigation measures will be considered and applied where and when they are appropriate for planned projects. Appropriate mitigation measures will also be applied to management responses to wildfires, when they can be implemented safely.

A. COMMON MITIGATION MEASURES

All Resources

- All suppression activities necessary to extinguish a fire would follow Minimum Impact Suppression Tactics (see http://www.wilderness.net/toolboxes/documents/fire/MIST_implementation.PDF).
- Due to the sensitivity of natural and cultural resources and the small size of the park, it is unlikely that fire retardant would be used. The use of fire retardant would require approval from the Superintendent, in accordance with NPS policy.
- In the case of wildfires, park resource advisors will immediately be notified of the fire ignition location and likely fire spread. If necessary, and if it is safe, efforts will be made to send resource specialists into the area to perform basic inventory work and locate features or resources that might need mitigation.

B. NATURAL RESOURCES

Geology and Soils

- During any fire management activity, impacts to soils will be minimized and areas with a high probability of erosion will be stabilized by utilizing the best available technology and rehabilitation methods.
- These methods will be determined by park fire and resource management staff, and could include the following: mulching, seeding with native plants, slashing, sand/soil bags, trenching, grade stabilizing, and check dams.

Hydrology/Water Quality

- Use of fire retardant will only be used when authorized by the park Superintendent. Guidelines for use of retardant can be found in the Interagency Standards for Fire and Fire Aviation (updated annually).

Vegetation

- Planned projects will follow the site-specific Prescribed Fire Plan or Mechanical Fuel Reduction Plan to achieve the desired conditions of park vegetation.
- Exotic plant populations will be monitored and treated after fire management projects or wildfire responses. Responses to exotic plant populations will follow the Tumacácori National Historical Park Invasive Plant Management Plan and Environmental Assessment (NPS 2008a).

Special-Status Species

- During the planning phase of any fire management activity, the presence of special-status species in the area will be determined. Park personnel will evaluate existing databases and maps and may request additional surveys for field verification.
- Providing direct protection of certain areas (such as nesting trees), altering the time or season of burning, or simply not allowing fire into parts of the unit are examples of possible mitigation measures for sensitive plants and wildlife.

- There will be no mechanical treatments or prescribed fire except during April or October in compliance with a memorandum from the US Fish and Wildlife Service (dated 3/11/13) to avoid potential disturbance within sensitive time periods of the yellow-billed cuckoo, southwestern willow flycatcher, and northern Mexican garter snake.

Air Quality

- All prescribed burning and pile burning will comply with State of Arizona air quality guidelines and smoke management regulations.
- A site-specific prescribed burn plan will be prepared for each project and will include all of the required elements related to air quality.
- Park staff will monitor air quality adjacent to project areas and within developed areas of the park. Unhealthy or hazardous accumulations of smoke will trigger an aggressive suppression action that will continue until the air quality attains acceptable levels.
- When adjacent land management agencies are managing prescribed fires or wildland fires, cooperation and coordination will be initiated to minimize cumulative smoke impacts.

C. CULTURAL RESOURCES

Archeological Resources and Historic Structures

- Compliance with Section 106 of the National Historic Preservation Act will be accomplished on a project-specific level, and will utilize the NPS Nationwide Programmatic Agreement for the project when possible.
- The park will continue to consult with Native American tribes about fire management planning and specific fire management actions in order to identify issues and resources of concern and to implement the most appropriate treatments.
- Prior to the start of planned work, archeologists, cultural resource specialists, or other resource management staff will instruct crews in identification of cultural materials and review federal and state laws protecting archeological sites and artifacts.
- All cultural sites within the project area will be identified and located by an archeologist, cultural resource specialist, or other resource management staff member. These sites should be avoided during fire management activities, unless the specific objective is to reduce fuels on the archeological site.
- Crews will avoid or minimize walking over structural elements.
- Known cultural resources will be evaluated for fuel buildup, and those fuels may be reduced as part of ongoing fuel reduction programs.
- Dead trees, regardless of species, will be evaluated for removal from structural elements of sites. Non-structural elements of sites will be treated using the same prescription as for the surrounding landscape.
- Three-inch diameter and smaller trees will be evaluated for removal. Cactus and other non-tree vegetation will be retained.
- Larger (over 3 inch diameter) woody species growing in structures will be retained unless an Archeologist, cultural resource specialist, or resource management staff member determines it would be detrimental to the stability or integrity of the structure.
- Heavy fuels (any dead woody material greater than 3-inch diameter) will be hand-carried off structural elements. Lighter slash can remain per recommendation of an Archeologist, cultural resource specialist, or resource management staff member.
- An archeologist, cultural resource specialist, or resource management staff member will be present on site during fire management treatments to identify structural elements, supervise directional tree felling, and placement of slash.

- To avoid damage to cultural resources, archeologists, cultural resource specialists, and/or other resource management staff will, whenever possible, aid in positioning holding lines, staging areas, and other fire suppression related activities in culturally sensitive areas.
- Archeologists, cultural resource specialists, and/or other resource management staff will be assigned as resource advisors to fires to advise of known important cultural resources in areas where potential impacts of fire could be reduced or avoided through emergency fuel reduction.
- Firefighters may apply heat protective fabric to protect wood or fire sensitive structures, ruins, or features under the direction of Resource Advisors and/or archeologists assigned to the incident.

Table 1 describes how each fire management objective will be met. Table 2 compares fire management activities between the two alternatives. Table 3 presents a summary of impacts by alternative.

Table 1. Methods Each Alternative Uses to Ensure Each Objective Is Met

Objective	No-action Alternative	Preferred Alternative
Objective #1: Protect life, property, and the park's natural and cultural resources from the effects of unwanted fire.	<ul style="list-style-type: none"> • Give primary consideration to firefighter, employee, and public safety and provide for the safety of the park's visitors, neighbors, and employees during all phases of fire management operations. • Implementing all fire management responses to wildfire will be in compliance with applicable laws, policies, and regulations. • All wildfires will be suppressed in the park. • Efficiently use available resources to suppress wildfires. • Implement a cooperative fire prevention program to reduce human-caused wildfires 	<p>Same methods as the No-action Alternative as well as the following:</p> <ul style="list-style-type: none"> • Use prescribed fire and/or mechanical treatments in the site's developed zones and in the wildland-urban interface to reduce the risk of property damage due to wildland fire and to provide for human safety and resource protection. • Create survivable space zones around structures and developed areas in the park and in the wildland-urban interface by using mechanical treatments and/or prescribed fire to clear vegetation and break continuity of fuels.
Objective #2: Prevent or mitigate impacts due to fire suppression activities.	<ul style="list-style-type: none"> • Use Minimum Impact Suppression Tactics and rehabilitate disturbed areas to protect and mitigate impacts on the park's natural, cultural and scenic resources. • Ensure that a resource advisor is present and/or consulted on all major wildfires. • Inform and train firefighters about the impacts of fire suppression on the park's sensitive natural and cultural resources. • Avoid the use of non-native seed to rehabilitate sites disturbed by wildland fires or their suppression. 	<ul style="list-style-type: none"> • Same methods as the No-action Alternative, plus fuel breaks and reduced fuel loading would facilitate suppression activities by improving firefighter access and mitigating hazardous fuel situations.

Objective	No-action Alternative	Preferred Alternative
Objective #3: Institute and maintain a Fire Information and Education Program.	<ul style="list-style-type: none"> • Conduct wildland fire prevention, information, education, and other activities in communities within and abutting the park, working in collaboration with local communities and county, state, and federal agencies with fire management interests. • Educate employees and the public about the scope and effect of wildland and prescribed fire management, including fuels management, smoke management, resource protection, fire prevention, hazard/risk assessment, mitigation, rehabilitation, the wildland/urban interface problem, and the role of fire in ecosystem management. • Maintain relationships with the Native American community and encourage their participation in the management of traditional gathering areas. Facilitate the transfer of knowledge about fire management and traditional cultural practices. • 	<p>Same methods as the No-action Alternative.</p>
Objective #4: Use prescribed fire to meet fire and resource management goals and objectives.	<ul style="list-style-type: none"> • Under the no action alternative, no prescribed fire would be allowed (except for invasive species identified under the invasive species plan). 	<ul style="list-style-type: none"> • Where applicable, restore fuel loads and plant community structure and composition to ranges of natural variability comparable to pre-Anglo settlement, combining pile burning with mechanical treatments. • Use management ignited prescribed fires to reduce hazardous fuels and minimize the occurrence of unnaturally intense wildland fires. • Avoid prescribed fires that would reduce air quality below federal, state, and local standards. • Train the site's staff and cooperators to conduct safe, objective-oriented prescribed fires consistent with DO-18 requirements. • Ensure that a resource advisor is present or consulted on all prescribed fires. • Institute and maintain a Fire Ecology Program that, at a minimum, utilizes the National Park Service's Fire Monitoring Handbook and current software to ensure that fire effects are monitored, recorded, and evaluated for all prescribed fires in the site.

Table 2. Comparison of Alternatives

No-action Alternative	Preferred Alternative
<p>Fuels Reduction: Under the no-action alternative there would be no planned fire management treatments, such as thinning activities, prescribed fire, pile burning, and other treatments, which would increase the risk of damage from wildfire. (Herbicides and pile burning of non-native invasive species would still be permitted under the park's invasive plant management plan.)</p> <p>Wildfires: Suppression actions can include hand crews cutting a line around the fire perimeter to remove live and dead vegetation; water and retardant drops from aircraft; emergency mechanical thinning; “burn out” situations in which fire is used to remove live and dead vegetation in an effort to stop the fire; and “cold trailing” in areas of low fuel loads, where crews physically feel the ground and put out “hot spots.”</p> <p>Suppression actions are normally handled by the Nogales Ranger District of the Coronado National Forest or cooperators such as the Tubac Fire District. NPS personnel act as advisors to provide local knowledge and protect the park's natural and cultural resources. In areas with sensitive natural or cultural resources, Minimum Impact Suppression Tactics are used and/or resource advisors are consulted.</p>	<p>Fuels Reduction: Mechanical fuel reduction treatments could occur. Some prescribed burning or pile burning may also occur.</p> <p>Wildfires: The actions are the same for the no-action alternative.</p>

Table 3. Summary of Impacts by Alternative (full description of impacts are in Chapter 3)

Impact Topic	No-action Alternative	Preferred Alternative
Geology and Soils	<p>Under the no-action alternative there would be no planned fire management events, such as thinning or prescribed fire, increasing the risk of damage from a wildfire. Short-term impacts would be site specific, direct and indirect, negligible to minor, and adverse from the loss of soil cover and possibly a reduction in productivity due to intense fire. Long-term impacts would be negligible as mesic alluvial soils would recover relatively quickly. Geologic resources would not be impacted as a result of wildfire or fire suppression activities.</p>	<p>The preferred alternative includes mechanical fuel reduction treatments and prescribed burning (including pile burning). Impacts include heating of the soil and disturbance from foot traffic of firefighters. Impacts from thinning and prescribed burning could be short-term, site specific, direct and indirect, negligible to minor, and adverse. However, these treatments would reduce fuel loads and could help protect soils from damage from future wildfires and indirectly protect existing soil resources in the long-term. Impacts from effects on future wildfires would be long-term, local, indirect, minor, and beneficial.</p>

Impact Topic	No-action Alternative	Preferred Alternative
Hydrology/Water Quality	Disturbance of soils as crews fight a wildfire, and ash runoff following the fire, may result in slight degradation of the park's surface water. A particularly hot burn could lead to heating of the water from the fire itself and from removal of tree canopies that shade the water. In addition, there could be excessive erosion and sediment input into the river, especially if the fire was quickly followed by heavy rain. The no-action alternative would result in direct and indirect, local, short- and long-term, negligible to minor, adverse impacts on water quality, including indirect impacts downstream from the park.	Disturbance of soils as crews conduct thinning activities, ash from prescribed burns, or runoff from treatments may result in slight degradation of the park's surface water. However, small buffers are sufficient to protect water quality, and mitigations required for this alternative would prevent adverse impacts to hydrology and water quality. Treatments would reduce fuel loads and could help protect hydrology and water quality from the threat from damage from future wildfires. Impacts would be local, indirect, short- and long-term, minor, and beneficial.
Vegetation	Without fuels management, the likelihood of additional damaging wildfires in the future would increase. Fire suppression activities such as the construction of firelines or the use of vehicles or other heavy equipment could result in site-specific soil disturbance and trampling or loss of vegetation. Some mortality in individual plants could occur. Increased disturbance from burned areas may lead to an increase in invasive plants. Short-term impacts would be direct and indirect, local, negligible to minor and adverse. Long-term impacts would be local, direct and indirect, minor and adverse from the loss of plant species cover and mortality of non-fire adapted species such as cottonwood and associated riparian species, which are long-lived overstory species.	Mechanical fuel reduction treatments, as well as prescribed burning and pile burning could result in ground disturbance and loss or damage to vegetation in treated areas. These treatments could protect vegetation by reducing the threat of future wildfire damage. Short-term impacts on vegetation would be site specific, direct, negligible to minor, and adverse from removal and disturbance of vegetation. Long-term impacts would be local, indirect, minor and beneficial, because of the reduced risk of damage from fire.
Special Status Species	Accumulations of standing and down woody material following the 2008 Mission Fire are resulting in unusually heavy fuel loading in the burned area. All of these special status species are either directly or indirectly dependent on the riparian gallery forests, and some may use adjacent mesquite bosques. Damage or loss of vegetation from intense wildfires could alter plant composition or forage and cover resources for these species, and ash could be washed into the river. There could be increased disturbance caused by fire suppression actions. Heating of the water could occur from the fire itself and from removal of shade. Effects of the no-action alternative would be short- and long-term, local, direct and indirect, minor to moderate adverse impacts to all of the special status species.	Mechanical fuel reduction treatments and prescribed burning (including pile burning) could be implemented, reducing the damage from future wildfires. Over the long-term, these treatments could help protect existing special status species habitat and promote native plant diversity and lessen disturbance to all species by fire suppression actions. A narrow buffer where fire is excluded next to the river should protect the topminnow. Potential adverse impacts to the other special status species resulting will be mitigated by conducting planned treatments outside critical nesting and hibernation times for these species (i.e., can only be implemented in April or October). Short- and long-term impacts would be local, direct and indirect, minor, and beneficial from enhanced protection of riparian areas.

Impact Topic	No-action Alternative	Preferred Alternative
Archeological Resources	<p>The buildup of fuels could increase the potential for fire damage and may present an elevated threat to archeological resources. Potential impacts could include cracking, charring, sooting, combustive residue, fracture, scorching, and melting.</p> <p>In addition, an increase in fire suppression actions may occur. Despite mitigations designed to protect archeological resources during fire suppression activities, some inadvertent damage could occur. Impacts on archeological resources from the no-action alternative would be long-term, site-specific, direct and indirect, minor, and adverse.</p>	<p>The park has been 100% surveyed, and strong mitigations are in place to protect archeological resources. The preferred alternative will reduce fuel loads to reduce the chances of damaging wildfire and may also reduce the need for fire suppression actions on park property or to protect adjacent private property. Impacts from the preferred alternative would be indirect, local, minor, long-term, and beneficial.</p>
Historic Structures	<p>Under the no-action alternative there would be no hazardous fuel treatments, such as thinning prescribed fire, pile burning, or other treatments, increasing the risk from damage from a wildfire. Most buildings are of non-flammable construction and in a well maintained landscape. Smoke staining is possible on some structures. Embers blown in on the wind can ignite external wooden components, such as lintels around doors or windows. Impacts from wildfire damage could be long-term, site specific, direct, minor, and adverse.</p> <p>Impacts from fire suppression actions are unlikely because the vegetation is sparse adjacent to historic structures. Impacts from wildfire suppression damage to the historic structures are anticipated to be negligible.</p>	<p>Historic structures, such as the missions, could benefit from implementation of mechanical fuel reduction treatments and prescribed burning that would lessen the potential for intense wildfires that can affect fire-susceptible historic structures. Impacts from prescribed burning will be avoided by planning that includes consideration for these structures. The main way to control prescribed fire impacts is to not burn near these structures, and to burn with lower intensities that would avoid smoke or ember impacts. Effects from the treatment activities themselves on historic structures would be negligible.</p> <p>Wildfires and fire suppression actions do have the potential to impact historic structures, but fuel reduction treatments will lessen this threat. Potential impacts could be similar to the no-action alternative but much less likely.</p> <p>The impact from reduced potential from damaging fire behavior is anticipated to be long-term, site specific, indirect, minor, and beneficial.</p>

ENVIRONMENTALLY PREFERABLE ALTERNATIVE

According to the CEQ regulations implementing NEPA (43CFR46.30), the environmentally preferable alternative is the alternative “that causes the least damage to the biological and physical environment and best protects, preserves, and enhances historical, cultural, and natural resources. The environmentally preferable alternative is identified upon consideration and weighing by the Responsible Official of long-term environmental impacts against short-term impacts in evaluating what is the best protection of these resources. In some situations, such as when different alternatives impact different resources to different degrees, there may be more than one environmentally preferable alternative.”

The proposed action (the preferred alternative) is also the environmentally preferable alternative. The proposed action provides more opportunities for management of fuels. Under the proposed action, managers may select a combination of treatments of fuels, and thus would be most effective at meeting goals and objectives. The fire management plan would provide for the health and safety of visitors and employees, and the preservation of natural and cultural resources. The public and cultural and natural resources would receive protection from wildfires with fewer disturbances.

The no-action alternative would not be the environmentally preferable alternative, because the combination of full suppression of wildfire and the lack of fuels treatments would allow for fuels accumulation which would create un-naturally hot wildfires which could eventually lead to vegetation type conversion.

PREFERRED ALTERNATIVE

No new information came forward from public scoping or consultation with other agencies to necessitate the development of any new alternatives, other than those described and evaluated in this document. The Fire Management Plan With Limited Fuels Management Activities alternative best meets the proposed action and goals, and is the environmentally preferable alternative, and the preferred alternative. From the remainder of this document, the Fire Management Plan With Limited Fuels Management Activities alternative will be referred to as the preferred alternative.

CHAPTER 3: AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES

This chapter describes the affected environment (existing setting or baseline conditions) and analyzes the potential environmental consequences (impacts or effects) that would occur as a result of implementing the proposed action. Direct, indirect, and cumulative effects are analyzed for each resource topic carried forward. Impacts are analyzed based on whether they are significant or not significant, which requires considerations of impact type, context, duration, and intensity:

- **Type** describes the classification of the impact as either beneficial or adverse, direct, or indirect:
 - *Beneficial*: a positive change in the condition of appearance of the resource or a change that moves the resource toward a desired condition.
 - *Adverse*: a change that moves the resource away from a desired condition or detracts from its appearance or condition.
 - *Direct*: an effect that is caused by an action and occurs in the same time and place.
 - *Indirect*: an effect that is caused by an action but is later in time or rather removed in distance, but is still reasonably foreseeable.
- **Context** describes the area or location in which the impact would occur. Effects may be site-specific, local, regional, or even broader.
- **Duration** describes the length of time an effect would occur, either short-term or long-term:
 - *Short-term* impacts generally last only during project implementation or immediately after, and the resources resume their pre-project conditions following project implementation.
 - *Long-term* impacts last beyond the project implementation period, and the resources may not resume their pre-project conditions for a longer period of time following project implementation.
- **Intensity** describes the degree, level, or strength of an impact. For this analysis, intensity has been categorized into negligible, minor, moderate, and major. Because definitions of intensity vary by resource topic, intensity definitions are provided separately for each impact topic analyzed in this EA.

Cultural Resources Impact Methodology

Cultural resource impacts were analyzed qualitatively, in accordance with 36 Code of Federal Regulations 800.5(a)(1), criteria of adverse impact, based on their presence in the project area and the modifications that would be made to character-defining features (features that qualify them for inclusion in the National Register). Cultural resources for which a determination of eligibility has not been completed were considered eligible. Adverse impacts result when impacts of an action diminish the characteristics that make the feature eligible for the National Register or diminish the overall integrity of the landscape.

Section 106 of the National Historic Preservation Act Methods for Assessing Effect. Pursuant to Director's Order 12 (sections 2.14(6) (3), 6.2 F, and 6.3 F and Appendix 3); 40 Code of Federal Regulations 1508.7, 1508.8, and 1508.27; and 36 Code of Federal Regulations 800.8, effect intensity, duration, context, and type as they relate to historic properties are determined with the criteria established in 36 Code of Federal Regulations Part 800. When the effect of an action results in an alteration to the characteristics of a cultural resource that qualifies it for inclusion in the National

Register of Historic Places as a historic property, the action is considered to have an adverse effect under Section 106 of the National Historic Preservation Act. The National Historic Preservation Act defines three types of effects as applied to historic properties. These include no effect, no adverse effect, and adverse effect.

No Historic Properties Affected — A “no historic properties affected” determination indicates that no historic properties are in the Area of Potential Effect or that there are historic properties in the Area of Potential Effect, but the undertaking would not alter the characteristics that qualify it for inclusion in or eligibility for the national register.

No Adverse Effect — A no adverse effect determination indicates that there would be an effect on the historic property by the undertaking, but the effect does not meet the criteria of adverse effect in 36 Code of Federal Regulations 800.5(a)(1) and would not alter any of the characteristics that make it eligible for listing on the national register in a manner that would diminish the integrity of the historic property. Operations, maintenance, rehabilitation, restoration, and preservation actions typically fall under this no adverse effect category.

Adverse Effect — An adverse effect indicates that the undertaking would alter, directly or indirectly, any of the characteristics that qualify it for inclusion in the national register in a manner that would diminish the integrity of the property. Adverse effects can be resolved by developing a three-party memorandum of agreement or programmatic agreement with the State Historic Preservation Officer and the Advisory Council on Historic Preservation, in consultation with the associated American Indian tribal governments, other consulting parties, and the public (36 Code of Federal Regulations 800.6).

CUMULATIVE IMPACT SCENARIO

The CEQ regulations which implement NEPA require assessment of cumulative impacts in the decision-making process for federal projects. Cumulative impacts are defined as “the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (federal or non-federal) or person undertakes such other actions (40 CFR 1508.7) Cumulative impacts are considered for both the no action and the preferred alternatives.

Cumulative impacts were determined by combining the impacts of the preferred alternative with other past, present, and reasonably foreseeable future actions. Therefore, it is necessary to identify other past, ongoing, or reasonably foreseeable future projects at Tumacácori National Historic Park and, if applicable, the surrounding region. The geographic scope for this analysis includes actions mostly within the park, while the temporal scope extends as long as the objectives continue to be met through repeated fuels treatments. Given this, the following projects identified for the purpose of conducting the cumulative effects analysis, listed from past to future:

- The park has conducted fuels reduction in the Tumacácori unit, including pile burning from 2006 to 2011, with additional treatments planned. Salt cedar trees and saplings were cut, piled, and burned in the riparian areas. A fuelbreak was also created, including pile burning and chipping, in mesquite thornscrub and mesquite bosque areas along the northwest part, adjacent to private property.
- The park is also conducting plant community restoration projects, including invasive plant management and the Restoration of Riparian Habitat Damaged by Human Activity. Other

current projects include the General Management Plan and Environmental Assessment, New Ruins Trail at San Jose de Tumacácori, Rehab of Old Sewer System, and Emergency Stabilization of the North Sacristy Wall.

- The General Management Plan gives direction over the next 15-20 years. Its primary elements for the Tumacácori unit include a loop trail in the riparian area, three to five picnic areas in the mesquite bosque, two to four access points to the river. For the Calabazas and Guevavi units, elements include trail segments linking them, new open air shade ramadas, and a parking area at Guevavi.
- *Restoration of Riparian Habitat Damaged by Human Activity (2009)*. The restoration of riparian habitat would restore native plant communities damaged by human activity by planting historically present species, and by upgrading, fixing, and securing fences and placing more signs to keep illegal traffic, cattle, and all-terrain vehicles out of the Santa Cruz River corridor. The project also includes planting of cottonwood/willow along the river and restoration activities in the burn area where plant communities were severely damaged by wildfire in 2008. In the upper portion of the floodplain, the project would seek to limit amaranth and promote mesquite and acacia species. The project would have a beneficial impact on threatened and endangered species and would promote a rich and diverse riparian habitat capable of supporting more native species of birds and small mammals.
- The 2008 Mission Fire burned approximately 85 acres in the park with variable severity, depending on the fuels. The southern part burned with moderate or high severity. This area had a closed cottonwood canopy with a dense herbaceous and shrubby understory. The northern portion had a more open canopy with a Bermuda grass understory, and it burned with moderate to low severity. Most of the fire stayed on the terraces. Few areas on the immediate banks of the river burned. Approximately three small areas directly on the river banks burned, and these areas appeared to be associated with recent tamarisk treatments where the slash was scattered and not piled. Cottonwood trees are highly susceptible to fire. Most of the trees in the burned areas were scorched, and many died.
- Other impacts from outside the park affecting park resources are grazing by trespass cattle when the fence is down and pollution and withdrawals from and additions to the flow of the Santa Cruz River. Groundwater pumping over a long period in the Santa Cruz watershed has removed much of the Santa Cruz River's natural surface flows. Groundwater is pumped for municipal and residential use, agriculture, and industry. Increased residential development in the Rio Rico and Tubac areas, as well as the city of Nogales, is expected to continue to withdraw additional water. Although the treated effluent from the Nogales International Wastewater Treatment Plant has substituted for natural flows in the river, additional groundwater pumping would likely affect the river and surface water available for vegetation and wildlife in the park. The flow of the river is anticipated to decline 5-20 percent when the new Los Alisos Wastewater Treatment Plan reaches full capacity (NPS 2013). Reduced flow and a change in flooding regime is limiting cottonwood regeneration, which require wet sand bars for germination and a water table high enough to allow survival. Grazing removes not only herbaceous species but small woody plants, especially cottonwood seedlings (Stromberg 1993).
- From sewage, industrial discharge, and runoff in the US and Mexico, water quality has been an issue in this reach of the Santa Cruz River. Cadmium, ammonia, phosphorus, and

especially the intestinal bacteria *E. coli* have exceeded water quality standards at times (Sonoran Institute 2011).

This stretch of the river was designated as “impaired” for ammonia and *E. coli* in 2010 (Arizona Department of Environmental Quality, <http://www.azdeq.gov/environ/water/assessment/assess.html>),. At times large mounds of trash have been deposited in the park by floodwater.

- Actions immediately surrounding the park that impact park resources include farming, grazing, and private housing. In addition, there are large numbers of visitors each year, and illegal border-related activity, such as fence-cutting and creation of foot trails. The park’s being in contact with large numbers of people can lead to impacts such as stray pets which harass wildlife, trespass cattle, plant harvesting, littering, and accidental and arson-caused wildfires.

GEOLOGY AND SOILS

AFFECTED ENVIRONMENT

Tumacácori National Historical Park is located in the southern Basin and Range province of southeastern Arizona. The terrain is alternating fault-bounded linear mountains and sediment-filled basins. The Santa Rita, San Cayetano, and the Patagonia mountain ranges to the east of the park consist of igneous, metamorphic, volcanic, and sedimentary rocks. The Tumacácori and Atascosa Mountains to the west of the park are composed primarily of volcanic rocks (Powell et al. 2005).

Soils throughout the park are typical of floodplains, alluvial fans, and valley slopes. They are deep and well-drained, often with high water holding capacity except for very sandy soils. Soils are primarily of the Comoro soil series and Pima soil series. The Comoro soil series consists of well-drained, gravelly sandy loam soils that are commonly found on wide flood plains and have slopes of 0 to 5 percent (SCS 1979). The Pima soil series generally occurs on flood plains and contain loams, silt loams, and silt clay loams. Slopes range from 0 to 3 percent. Depth for both soil series is 60 inches or more (SCS 1979). Generally, these soils support wildlife habitat, irrigated crops, rangeland, and home sites.

REGULATIONS AND POLICIES

According to National Park Service *Management Policies 2006* (NPS 2006), the park system units are to preserve and protect geologic and soil resources. They are to strive to understand soil resources, and to the extent possible, prevent their unnatural erosion, physical removal, or contamination, and their contamination of other resources. Table 4 presents impact intensity thresholds.

Table 4. Geology and Soils Impact Intensity Thresholds

Impact Topic	Negligible	Minor	Moderate	Major	Duration of Impact
Geology & Soils	Impacts to geologic resources or soils would not be measureable or of perceptible consequence.	Changes are detectable but local. Mitigation to offset adverse effects would be standard, noncomplex, and effective.	Effects are apparent over a large portion of the park. Necessary measures to mitigate adverse effects would be likely successful.	Impacts are severe or of exceptional benefit over a wide area. Mitigation to offset adverse effects would be needed, but success not assured.	Short-term refers to durations of less than 5 years. Long-term refers to durations in excess of 5 years.

IMPACTS OF THE NO-ACTION ALTERNATIVE

Under the no-action alternative there would be no planned fire management events, such as thinning activities or broadcast prescribed fire, and other treatments, increasing the risk of damage from a wildfire. Herbicides and limited pile burning for non-native invasive vegetation treatment would still be permitted under the park's invasive plant management plan. Accumulations of standing/down woody material following the 2008 Mission Fire is resulting in unusually heavy fuel loading in the burned area. Without fuels management on this and other areas, the likelihood of damage from future wildfires would increase.

Loss of vegetative cover due to intense wildfire could affect soil quality through the loss of soil structure and temporary reduced porosity of soils in these impacted areas. The direct effects of wildfire on soil properties may include changes in soil chemistry and a reduction in porosity and organic matter (Neary et al. 2005). Ground disturbance associated with wildfire and fire suppression activities such as the use of heavy equipment or the construction of fire lines could have direct short-term adverse effects on soils due to compaction and potential erosion. Off-road use of heavy equipment would require approval by the superintendent. Short-term impacts would be site specific, direct and indirect, negligible to minor, and adverse from the loss of soil cover and possibly a reduction in productivity. Because the area is on level or nearly level floodplains, soil erosion is not an issue. Long-term impacts would be negligible as mesic alluvial soils would recover relatively quickly. Geologic resources would not be impacted as a result of wildfire or fire suppression activities.

Cumulative Impacts

Actions within the park affecting geology and soils include riparian habitat restoration work, as well as proposed trail, picnic area, and ramada construction, which have negligible to minor impacts. When combined with other past, present, and reasonably foreseeable future actions, the no-action alternative would be expected to provide a negligible contribution to the overall cumulative impacts on geology and soils.

Conclusion

Under the no-action alternative, direct and indirect, site-specific, negligible to minor, short-term, adverse effects could occur due to ground disturbance and loss of vegetation cover from wildfire and wildland fire suppression activities. Long-term impacts would be negligible. Geologic resources

would not be impacted as a result of the no-action alternative. Contributions of this alternative to cumulative impacts are negligible.

IMPACTS OF THE PREFERRED ALTERNATIVE

Mechanical fuel reduction treatments and prescribed burning (including pile burning) would be implemented to restore areas to their natural fuel loading, protect human life and property, prevent damage to cultural and natural resources and physical facilities, and reduce future wildfires. Mechanical treatments such as slashing and the removal of dead shrubs and trees could result in minor ground disturbance. Because of intense heat and prolonged burning, pile burning can cause heat impacts to the soil such as water repellency, removal of organic matter, change of soil structure, and impacts to soil microbes and invertebrates. However, soil is a good insulator, and heat penetration into the soil is often fairly shallow and limited to the concentrations of heaviest fuels (Certini 2005). These impacts are related to the peak temperature and the duration, and are often relatively short-lived. Keeping piles relatively small, about the size of a car, helps reduce this impact. Prescribed burning could cause minor soil disturbance if fuel breaks needed to be created, but burning vegetation that is dispersed and not piled generally has little impact on the soil except under large logs that produce large amounts of heat for an extended time. Impacts from thinning and prescribed burning could be short-term, site specific, direct and indirect, negligible to minor, and adverse. However, these treatments would reduce fuel loads and could help protect soils from damage from future wildfires and indirectly protect existing soil resources in the long-term. Impacts from effects on future wildfires would be long-term, local, indirect, minor, and beneficial.

Cumulative Impacts

When combined with other past, present, and reasonably foreseeable future actions, the preferred alternative would be expected to provide a negligible effect on the overall cumulative impacts on geology and soils.

Conclusion

Impacts to the soils resource would be direct and indirect, site specific, negligible to minor, short-term, and adverse from ground disturbing activities. The long-term impacts would be indirect, local, minor and beneficial because of reduced fuel loading. Contributions of this alternative to cumulative impacts are negligible.

HYDROLOGY/WATER QUALITY

AFFECTED ENVIRONMENT

The Tumacácori Mission unit of Tumacácori National Historical Park protects a mile of the Santa Cruz River and its rare southwest cottonwood-willow riparian (streamside) environment, one of the most endangered ecosystems in the United States. A “riparian” area is the lush corridor of water-loving plants growing along the banks of a river or stream. These ecosystems are essential habitat for many plants, birds, and other animals which could not otherwise live in the surrounding desert and scrub environments.

The Santa Cruz River is naturally an intermittent stream, with water flowing only beneath the sandy surface in places during parts of the year. Communities such as Tumacácori, Guevavi, and Tubac

persisted over hundreds of years at locations along the river where water was forced to the surface by high bedrock, providing a more reliable water source.

Groundwater pumping has removed much of the river's natural flow. However, since 1972 treated effluent has been released into the streambed by the Nogales International Wastewater Treatment Plant in Rio Rico. This artificial flow alters the natural conditions of the stream, along with its streamside environment. The increased water supply not only replaces water lost to groundwater pumping, but provides an otherwise unavailable year-round water supply, allowing the growth of lush streamside habitat and providing a home for many plants and animals.

REGULATIONS AND POLICIES

National Park Service Management Policies 2006 (NPS 2006), Director's Order #77-1 – Wetland Protection, and Director's Order #77-2 – Floodplain Management provide some guidance on management of hydrologic systems. Table 5 describes impact intensity thresholds for hydrology/water quality.

TABLE 5. HYDROLOGY/WATER QUALITY IMPACT INTENSITY THRESHOLDS

Impact Topic	Negligible	Minor	Moderate	Major	Duration of Impact
Hydrology/ Water Quality	Impact barely detectable and not measurable; if detected, would not be of any perceptible consequence, or would be transient.	Impact measurable but local and of little consequence. No mitigation measures necessary.	Changes have consequences to sensitive receptors, but effects remain local. Mitigation measures necessary and likely effective.	Changes have substantial consequences to sensitive receptors. Mitigation measures are necessary but success of measures not assured.	Short-term refers to hours or days, i.e., the duration of the fire incident. Long-term is substantially beyond the incident or action.

IMPACTS OF THE NO-ACTION ALTERNATIVE

Under the no-action alternative there would be no fuel reduction treatments, such as thinning activities, prescribed fire, and other treatments, increasing the risk of damage from a wildfire. Herbicides and a minimal amount of pile burning for vegetation treatment would still be permitted under the park's invasive plant management plan. Accumulations of standing/down woody material following the 2008 Mission Fire is resulting in unusually heavy fuel loading in the burned area. Without fuels management on this and other areas, the likelihood of damage from future wildfires would increase.

Disturbance of soils as crews fight a wildfire, and ash runoff following the fire, may result in slight degradation of the park's surface water. A particularly hot burn could lead to heating of the water from the fire itself and from removal of tree canopies that shade the water. Due to the presence of water, shade should be restored within a few years. In addition, there could be excessive erosion and sediment input into the river (Neary et al. 2005). Smaller burns could also lead to some run-off and sediment input into surface water. Effects would be most severe if a wildfire were soon followed by heavy monsoon rains. Aerial fire retardant can be toxic to aquatic organisms, mainly through the

introduction of ammonia to water. It should be noted that retardant is less toxic than ash resulting from a fire (Giménez et al. 2004). Interagency policies about retardant use state that aerial application of retardant or foam will be avoided within 300 feet of waterways, and the superintendent must approve retardant use in the park. Under both alternatives, it is unlikely that retardant would be used because of sensitive aquatic resources. The no-action alternative would result in direct and indirect, local, short- and long-term, negligible to minor, adverse impacts on water quality, including indirect impacts downstream from the park.

Cumulative Impacts

Other actions affecting hydrology and water quality are mainly outside the park. Water quality has exceeded standards for cadmium, ammonia, phosphorus, and *E. coli* at times due to residential and industrial discharges, and this stretch of the river has been deemed impaired for ammonia and *E. coli*. Water quantity has declined from water use and may decline further from retention of sewage in Mexico. When combined with other past, present, and reasonably foreseeable future actions, the no-action alternative would be expected to provide a negligible to minor increase to the overall negative cumulative impacts on hydrology and water quality.

Conclusion

The no-action alternative would result in direct and indirect, local, short- and long-term, negligible to minor, adverse impacts on water quality from increased soil disturbance and ash from intense fire behavior and suppression actions. Contributions of this alternative to cumulative impacts are negligible to minor and adverse.

IMPACTS OF THE PREFERRED ALTERNATIVE

Disturbance of soils as crews conduct thinning activities, ash from prescribed burns, or runoff from treatments may result in slight degradation of the park's surface water. However, for low intensity fires, a buffer of two feet is sufficient to protect water quality. For larger or more intense fire behavior, a buffer of 30 feet is adequate (Reardon et al. 2005). Mitigations required for this alternative would prevent adverse impacts to hydrology and water quality. These treatments would reduce fuel loads and could help protect hydrology and water quality from the threat from damage from future wildfires. Impacts would be local, indirect, short- and long-term, minor, and beneficial.

Cumulative Impacts

When combined with other past, present, and reasonably foreseeable future actions, the preferred alternative would be expected to provide a negligible impact to the overall cumulative impacts on hydrology and water quality.

Conclusion

Under the preferred alternative, reduction of fuels and decreasing potential from wildfire damage will result in indirect, local, short- and long-term, minor benefits. Cumulative impacts are negligible.

VEGETATION

AFFECTED ENVIRONMENT

Tumacácori National Historical Park lies in the Arizona Upland division of the Sonoran Desert, and upland parts have vegetation typical of a semi desert grassland association. Species common in the semi desert grassland community include velvet mesquite (*Prosopis velutina*), catclaw acacia (*Acacia greggii*), whitethorn acacia (*Acacia constricta*), wolfberry (*Lycium macrodon*), and annual and perennial grasses and forbs. Vegetation in the riparian areas along the Santa Cruz River is composed primarily of cottonwood-willow (*Populus fremontii*-*Salix gooddingii*) riparian gallery forest and woodland communities, with mesquite forest (bosque) and woodland communities on adjacent terraces (Powell et al. 2005) (Figure 2). Another species common in the forest and woodland communities is hackberry (*Celtis laevigata* var. *reticulata*). Cottonwoods killed during the 2008 Mission Fire are increasing fuel loading in places in the riparian area and may be increasing the potential for damaging fires.

An invasive nonnative plant inventory was conducted in 2007, which identified 14 non-native species occurring throughout the park (Studd and Zepp 2009). The old agricultural areas in the southern part of the park show disturbance and are heavily infested with nonnative species. To a lesser extent, the old agricultural areas in the northern part of the park contain many nonnative plants, but these occur mostly under existing native trees and shrubs. The riparian area of the park has several nonnative species, but these are found sporadically in groups or as individual plants and do not currently pose a risk (Studd and Zepp 2009). Some of the most common nonnative species occurring in the park include Johnson grass (*Sorghum halepense*), Lehmann lovegrass (*Eragrostis lehmanniana*), tree of heaven (*Ailanthus altissima*), horehound (*Marrubium vulgare*), tamarisk (*Tamarix chinensis*), Bermuda grass (*Cynodon dactylon*), Russian thistle (*Salsola tragus*), and poison hemlock (*Conium maculatum*). Salt cedar is actively controlled in the park under the invasive species EA and has been nearly eradicated. It can form dense thickets and can burn intensely and produce numerous firebrands, causing severe adverse impacts to native riparian plant communities (Busch 1995). After the Mission fire, tree tobacco (non-native) and amaranth (a native that can increase rapidly with disturbance) increased substantially, resulting in the need for extensive treatment.

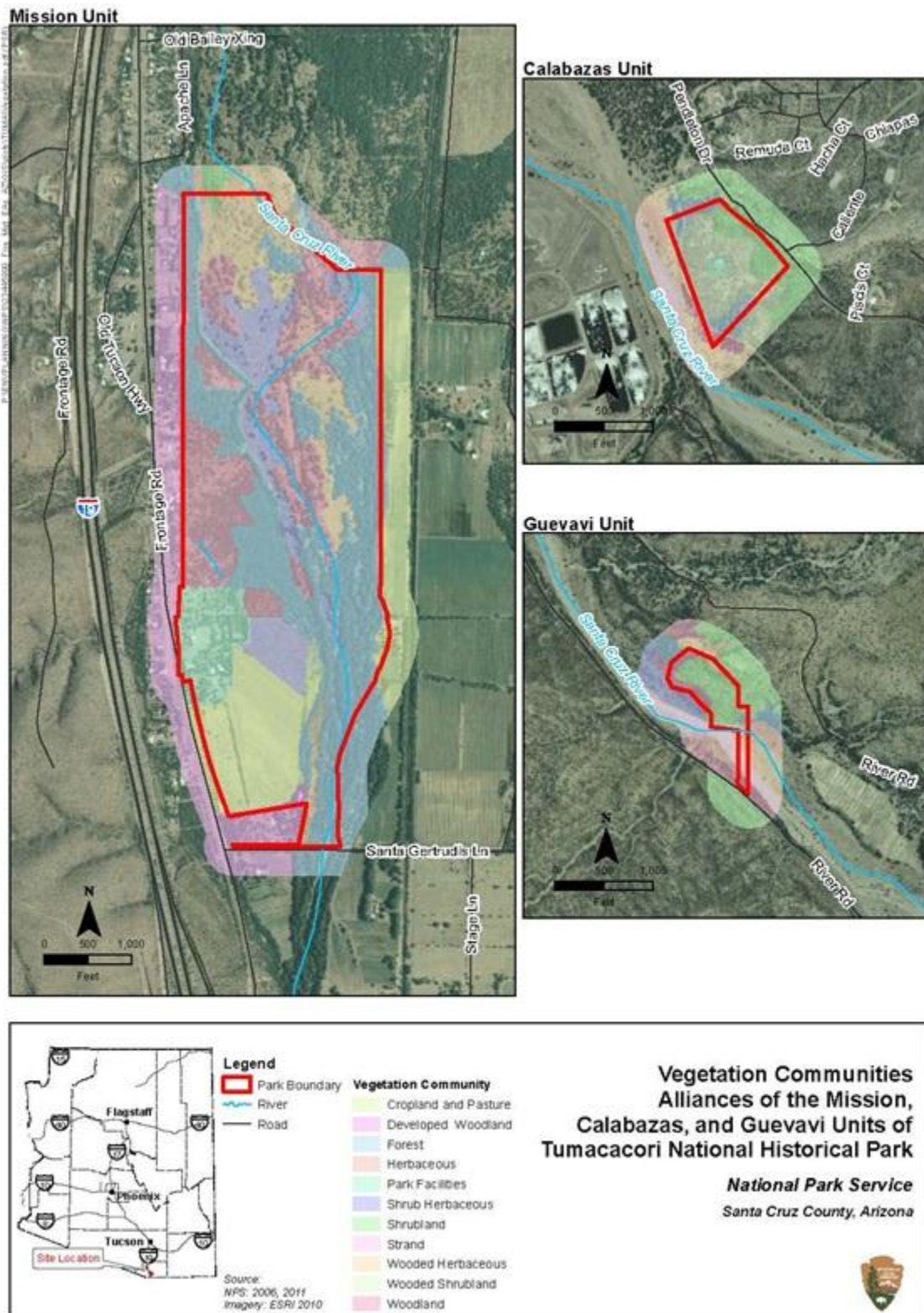
REGULATIONS AND POLICIES

According to National Park Service *Management Policies 2006* (NPS 2006), the park system units are to maintain the components and processes of naturally evolving ecosystems, which include the natural abundance, diversity, and ecological integrity of plants. In addition, *Management Policies 2006*, Director's Order # 12 – *Conservation Planning, Environmental Impact Analysis, and Decision-making*, and Director's Order # 77-7 – *Integrated Pest Management* require that all park system units use integrated pest management to address invasive plant and other pest issues. Table 6 presents impact intensity thresholds.

Table 6. Vegetation Impact Intensity Thresholds

Impact Topic	Negligible	Minor	Moderate	Major	Duration of Impact
Vegetation	Vegetation would not be affected; effects limited to small areas.	Effects would be local on one or more species or populations. Response to fire and/or other treatments would be within the natural range of fire effects. Any adverse effects can be effectively mitigated.	A large segment of one or more species populations show effects that are of importance, but relatively local. Response to fire and/or other treatments would be within the expected range of fire effects. Mitigation could be extensive, but likely effective.	Considerable effects on populations over large areas. Impact is severe or of exceptional benefit to native species. Response to fire and/or other treatments would be outside the range of expected fire effects. Extensive mitigation required offsetting adverse effects to native species, but success not assured.	Short-term refers to a period of up to 3 years. Long-term refers to a period longer than 3 years.

Figure 2. Vegetation Communities of Tumacácori National Historical Park



IMPACTS OF THE NO-ACTION ALTERNATIVE

Under the no-action alternative, there would be no thinning activities, prescribed fire, and other treatments, increasing the risk of a damaging wildfire. Herbicides and a minimal amount of pile burning for non-native species treatment would still be permitted under the park's invasive plant management plan. Without fuels management, the likelihood of additional damaging wildfires in the future would increase. Wildland fire suppression activities such as the construction of firelines or the use of vehicles or other heavy equipment could result in site-specific soil disturbance and trampling or loss of vegetation. Off-road use of heavy equipment would require approval by the superintendent. Some mortality in individual plants could occur. Increased disturbance from burned areas may lead to an increase in invasive plants. Rehabilitation efforts and monitoring for invasive species would partially mitigate these concerns. Short-term impacts would be direct and indirect, local, negligible to minor and adverse. Long-term impacts would be local, direct and indirect, minor and adverse from the loss of plant species cover and mortality of non-fire adapted species such as cottonwood and associated riparian species, which are long-lived overstory species.

Cumulative Impacts

The Mission Fire of 2008 killed many large cottonwoods. Because of grazing, the change in flooding regime, which reduces creation of fresh sandbars, and because of the soil moisture alteration, the riverbanks are less hospitable for cottonwood regeneration. Other actions affecting vegetation are the creation of new trails, ramadas, and picnic areas and the riparian restoration work. The no-action alternative may result in potentially more severe fire behavior, and with more mortality of woody plants, especially cottonwood. When combined with other past, present, and reasonably foreseeable future actions, the no-action alternative would be expected to provide a minor increase in the overall negative cumulative impacts on vegetation.

Conclusion

Short-term impacts would be local, direct and indirect, minor and adverse from the loss of vegetation related to increased wildfires and burn severity, and disturbance from suppression. Long-term impacts would be local, direct and indirect, minor and adverse from the loss of riparian gallery forest species such as cottonwood. The contribution to cumulative effects would be minor and adverse.

IMPACTS OF THE PREFERRED ALTERNATIVE

Mechanical fuel reduction treatments, as well as prescribed burning and pile burning may occur in areas of interface with private lands and in developed areas to protect life and property, in agricultural areas, and on terraces along the Santa Cruz River to reduce hazardous fuels accumulations to protect this unique habitat. Mechanical fuel reduction treatments include activities such as thinning or limbing up trees or shrubs and the removal of dead shrubs, creating fuel breaks. These treatments could result in ground disturbance and loss or damage to vegetation in treated areas. However, these treatments could protect vegetation by reducing the threat of future wildfire damage. Short-term impacts on vegetation would be site specific, direct, negligible to minor, and adverse from removal and disturbance of vegetation. Long-term impacts would be local, indirect, minor and beneficial, because of the reduced risk of damage from fire.

Cumulative Impacts

When combined with other past, present, and reasonably foreseeable future actions, the preferred alternative would be expected to provide a minor decrease to the overall negative cumulative impacts on vegetation.

Conclusion

Short-term impacts would be site specific, direct, negligible to minor, and adverse from the disturbance of vegetation during treatments. Long-term impacts would be local, indirect, minor and beneficial as the vegetation recovers and from the reduced impacts from future fires. The contribution to cumulative effects would be minor and beneficial.

SPECIAL STATUS SPECIES

AFFECTED ENVIRONMENT

Four special status species (threatened, endangered, or candidate) are of concern within the park, in the Tumacácori unit. Mitigation measures developed in cooperation with the US Fish and Wildlife Service include avoiding fire management activities during critical migration, nesting and hibernation times. No projects will be implemented except during April and October in order to avoid potential impacts to these species (see letter from USFWS, 2013).

Yellow-billed cuckoo (*Coccyzus americanus*) – Proposed threatened

Habitat for the yellow-billed cuckoo in the southwestern United States is limited to narrow, and often widely separated patches of riparian cottonwood-willow gallery forest (salt cedar is also used by the cuckoo). Dense understory foliage appears to be an important factor in nest site selection, while cottonwood trees are an important foraging habitat. The species is usually found at elevations less than 6,600 feet. The loss, degradation, and fragmentation of riparian habitat have been identified as the primary factors causing yellow-billed cuckoo declines in the western United States (AGFD 2011). Playback tape surveys for the yellow-billed cuckoo were completed between 2008 and 2011 resulting in the identification of up to nine mating pairs in the park. Currently, the population is one of the largest identified in Arizona and possibly the southwest. This confirms the work of Powell (2001) and suggests that the 2008 Mission fire has not severely impacted cuckoos. However, the most intensely burned area at the southeast corner of the unit where cottonwood mortality was most severe once had a few pairs, and none were detected in this area after the fire.

Southwestern willow flycatcher (*Empidonax traillii extimus*) – Endangered

The Southwestern willow flycatcher breeds in dense riparian habitats along rivers, streams, or other wetlands. Critical habitat has been designated for the flycatcher along the Santa Cruz River from the international border with Mexico to approximately 26 miles downstream, including the reach through Tumacácori. Flycatchers prefer vegetation dominated by dense growth of willows (*Salix* species), seep willow (*Baccharis* species), or other shrubs and medium-sized trees. In some areas, the flycatcher will nest in habitats dominated by tamarisk and Russian olive (*Eleagnus angustifolia*). One of the most important characteristics of the habitat appears to be the presence of dense vegetation. The species has declined primarily due to riparian habitat reduction, degradation, and elimination as a result of agricultural and urban development. Other reasons for the decline/vulnerability of the flycatcher include the fragmented distribution and low numbers of the current population (USFWS 2002). The Southwestern willow flycatcher has been documented as an occasional migrant through

the park, but is not known to nest here. Although the area has been designated as critical habitat for the flycatcher, Tumacácori lacks the dense, shrub to medium size tree habitat preferred by the species.

Gila topminnow (*Poeciliopsis occidentalis occidentalis*) -- Endangered

The Gila topminnow occurs in small streams, springs, and cienegas below 4,500 feet in elevation, primarily in shallow areas with aquatic vegetation and debris for cover. In Arizona, most of the remaining native populations are in the Santa Cruz River system. Reasons for its decline include the introduction and spread of non-native predatory and competitive fish, bullfrogs, and crayfish, water impoundment and diversion, water pollution, groundwater pumping, stream channelization, and habitat modification (Weedman 1998). The Gila topminnow has not been found within park boundaries since the 2005 survey, but recent improvements in water quality may result in this species returning to the park. It currently is found in the Santa Cruz River upstream in Mexico and near its headwaters in Arizona.

Northern Mexican gartersnake (*Thamnophis eques megalops*) – Proposed Threatened

The northern Mexican gartersnake are most abundant in densely vegetated habitat surrounding cienegas, cienega-streams, and stock tanks and in or near water along streams in valley floors and generally open areas, but not in steep mountain canyon stream habitat. They occasionally are found in desert and lower oak woodland habitats as well. The species is most often found in Arizona at elevations between 3,000 and 5,000 feet, and have been detected at elevations up to 8,500 feet. Threats to the species population and habitat are predation by introduced bullfrogs and predatory fishes, urbanization, lowered water tables, and habitat destruction, including that due to overgrazing (USFWS 2010). Surveys have not detected the gartersnake within the park; however, suitable habitat exists including dense herbaceous vegetation near the river, with woody debris for hibernation.

REGULATIONS AND POLICIES

The Endangered Species Act of 1973 requires all federal agencies to promote the conservation of listed threatened or endangered species and their critical habitats. According to National Park Service *Management Policies 2006* (NPS 2006), the national park system units are to maintain the components and processes of naturally evolving ecosystems, which include the natural abundance, diversity, and ecological integrity of animals. Table 7 presents impact intensity thresholds for special status species.

Table 7. Special Status Species Impact Intensity Thresholds

Impact Topic	Negligible	Minor	Moderate	Major	Duration of Impact
Special Status Species	Special status species would not be affected, or effects would not be measurable. Any effects to abundance, distribution, and reproduction would be slight. No mitigation would be required.	Effects to special status species would be measurable. There would be effects to abundance, distribution, and reproduction and to available habitat. Mitigation measures would be required and would be sufficient to offset effects.	Effects to special status species would be readily apparent. There would be noticeable effects to abundance, distribution, and reproduction and to available habitat. Mitigation measures would be required and could be sufficient to offset effects.	Effects to special status species would be readily apparent and would result in the direct or indirect loss of occupied breeding sites, take of individuals, or suitable habitat. Mitigation measures would be required but may not be sufficient to offset effects.	Short-term refers to hours or days, i.e., the duration of the fire incident. Long-term is substantially beyond the incident or action.

IMPACTS OF THE NO-ACTION ALTERNATIVE

Under the no-action alternative there would be no hazardous fuels reduction treatments except for a minimal amount of pile burning under the invasive plant management plan. Accumulations of standing and down woody material following the 2008 Mission Fire are resulting in unusually heavy fuel loading in the burned area. Without fuels management on these areas, the likelihood is increasing of increased fire severity that could impact riparian vegetation that forms important habitat for all of the special status species listed for the park. All of these special status species are either directly or indirectly dependent on the riparian gallery forests, and some may use adjacent mesquite bosques. The impacts of wildfire on special status species vary depending on fire size and timing. Damage or loss of vegetation from wildfires could alter plant composition or forage and cover resources for the yellow-billed cuckoo. The loss of vegetation would also reduce the availability of habitat used for nesting and breeding. There could be increased disturbance caused by fire suppression actions. The Gila topminnow could be indirectly impacted with the loss of vegetation, introduction of ash sediment into the Santa Cruz River (see Kershner et al. 2003). Heating of the water could occur from the fire itself and from removal of shade (see Neary et al. 2005). Aerial fire retardant can be toxic to aquatic organisms, including fish, mainly through the introduction of ammonia to water (Giménez et al. 2004). Interagency policies about retardant use state that aerial application of retardant or foam will be avoided within 300 feet of waterways, and the superintendent must approve retardant use in the park. Under both alternatives, it is unlikely that retardant would be used because of sensitive aquatic resources. Effects of the no-action alternative would be short- and long-term, local, direct and indirect, minor to moderate adverse impacts to all of the special status species.

Cumulative Impacts

The Mission Fire killed many large cottonwoods along the Santa Cruz River. Because of grazing, the change in flooding regime, which reduces creation of fresh sandbars, and because of the soil moisture alteration, cottonwood regeneration has been reduced. Cottonwood trees are important for all three special status species for habitat or shade. Other actions impacting special status species

are creation of new trails (from the associated disturbance by visitors) in riparian areas, riparian restoration work, and declining water quantity. The no-action alternative may result in potentially more severe fire behavior, and especially more cottonwood mortality in riparian areas, negatively impacting special status species, especially the yellow-billed cuckoo. When combined with other past, present, and reasonably foreseeable future actions, the no-action alternative would be expected to provide a minor increase to the overall negative cumulative impacts on special status species.

Conclusion

Loss of stream-side habitat would have direct and indirect, local, short and long-term minor to moderate adverse effect to all special status species. The contribution to cumulative effects from this alternative are minor and adverse.

IMPACTS OF THE PREFERRED ALTERNATIVE

Mechanical fuel reduction treatments and prescribed burning (including pile burning) could be implemented to restore areas to their natural fuel levels, protect human life and property, prevent damage to natural resources, and to reduce the damage from future wildfires. Over the long-term, these treatments could help protect existing special status species habitat from the threat of future wildfires and promote native plant diversity. This could indirectly improve habitat for the yellow-billed cuckoo, northern Mexican gartersnake, and Gila topminnow and lessen disturbance to all species by fire suppression actions. A narrow buffer next to the river should protect the topminnow. For low intensity fires, a buffer of two feet is sufficient to protect water quality, or 30 feet for more intense fire or disturbance (see Reardon et al. 2005).

Short- and long-term impacts would be local, direct and indirect, minor, and beneficial from enhanced protection of riparian areas. Potential adverse impacts to the Southwestern willow flycatcher, yellow-billed cuckoo, and northern Mexican garter snake will be mitigated by conducting treatments outside critical nesting and hibernation times. Treatments could only be done in April or October.

Cumulative Impacts

When combined with other past, present, and reasonably foreseeable future actions, the preferred alternative would be expected to provide a negligible contribution to cumulative impacts on special status species.

Conclusion

Strong mitigations and restrictions would be in place to protect special status species. The preferred alternative would result in local, direct and indirect, minor, short- and long-term beneficial impacts for special status species. Implementing mechanical fuel reduction treatments and prescribed burning would help reduce the threat of wildfire damage and fire suppression disturbance. Contributions of this alternative to cumulative impacts are negligible.

IMPACTS TO CULTURAL RESOURCES AND SECTION 106 OF THE NATIONAL HISTORIC PRESERVATION ACT

In this environmental assessment/assessment of effect, impacts to cultural resources are described in terms of type, context, duration, and intensity, which is consistent with the regulations of the Council on Environmental Quality that implement the National Environmental Policy Act. These impact analyses are intended, however, to comply with the requirements of both the National Environmental Policy Act and Section 106 of the National Historic Preservation Act. In accordance with the Advisory Council on Historic Preservation's regulations implementing Section 106 of the National Historic Preservation Act (36 CFR Part 800, Protection of Historic Properties), impacts to archeological resources and the cultural landscape were identified and evaluated by (1) determining the area of potential effects; (2) identifying cultural resources present in the area of potential effects that were either listed in or eligible to be listed in the National Register of Historic Places; (3) applying the criteria of adverse effect to affected cultural resources either listed in or eligible to be listed in the National Register; and (4) considering ways to avoid, minimize or mitigate adverse effects.

Under the Advisory Council's regulations a determination of either adverse effect or no adverse effect must also be made for affected National Register eligible cultural resources. An adverse effect occurs whenever an impact alters, directly or indirectly, any characteristic of a cultural resource that qualify it for inclusion in the National Register (e.g. diminishing the integrity of the resource's location, design, setting, materials, workmanship, feeling, or association). Adverse effects also include reasonably foreseeable effects caused by the preferred alternative that would occur later in time, be farther removed in distance or be cumulative (36 CFR Part 800.5, Assessment of Adverse Effects). A determination of no adverse effect means there is an effect, but the effect would not diminish in any way the characteristics of the cultural resource that qualify it for inclusion in the National Register.

Council on Environmental Quality regulations and the National Park Service's *Conservation Planning, Environmental Impact Analysis and Decision-making* (Director's Order #12) also call for a discussion of the appropriateness of mitigation, as well as an analysis of how effective the mitigation would be in reducing the intensity of a potential impact, e.g. reducing the intensity of an impact from major to moderate or minor. Any resultant reduction in intensity of impact due to mitigation is an estimate of the effectiveness of mitigation under the National Environmental Policy Act only. It does not suggest that the level of effect as defined by Section 106 is similarly reduced. Although adverse effects under Section 106 may be mitigated, the effect remains adverse.

A Section 106 summary is included in the impact analysis sections under the preferred alternative. The Section 106 summary is intended to meet the requirements of Section 106 and is an assessment of the effect of the undertaking (implementation of the alternative) on cultural resources, based upon the criterion of effect and criteria of adverse effect found in the Advisory Council's regulations.

ARCHEOLOGICAL RESOURCES

AFFECTED ENVIRONMENT

Archeological sites within the Santa Cruz River Valley include prehistoric sites, historic Pima-Papago and Apache sites, Spanish Colonial sites, and Anglo ranching and mining sites. These sites have aboveground structures, surface artifacts or scatters, and buried archeological deposits. The park

protects the standing and subsurface ruins of the churches, conventos, and parts of the community grounds of the Tumacácori, Guevavi, and Calabazas ruins. Along with these ruins, which date to the 1700s and 1800s, the park also contains subsurface and surface scatter remains of pre-mission O'odham and prehistoric Hohokam and Trincheras cultures, as well as post-mission settlement (NPS 2008b). Archeological investigations at Tumacácori have taken place since shortly after the establishment of it as a national monument, with the first documented excavations being conducted between 1917 and 1918 by Frank Pinkley, custodian of Tumacácori and Casa Grande, and continued in 1919 by A.S. Noon, for the purpose of removing debris from the church to identify features and aid in preservation and stabilization.

All three units of Tumacácori National Historical Park have been completely surveyed by professional archeologists. A 100% survey of the Tumacácori unit was completed by Western Archeological and Conservation Center archeologists in 2004-2005. The Guevavi and Calabazas units have been surveyed twice, in 1992 and 2010. There are three artifact scatters within the main unit of Tumacácori that lack integrity due to the effects of agricultural activities spanning the Mission Period through modern times. These scatters suggest occupation spanning the Late Archaic (about 10,000 to 2,000 years ago) through the modern era. The scatters are located within abandoned fields east of the church, and on the terrace north of the church in mesquite bosque (which were agricultural fields in the past). Artifact scatters are a mix of ceramic and lithic artifacts and can include materials that are diagnostic in dating or classifying the sites and increasing knowledge about human occupation of the area.

Both the historic and prehistoric period sites consist of buried and exposed features. Tumacácori, Guevavi, and Calabazas are managed as individual sites that include the structures and buried archeology. Thirty-six features at Guevavi and 26 features at Calabazas have been identified and recorded. The Guevavi features include remains of the church, convento, plaza, several compounds and other structures, adobe borrow pits, bedrock mortars, and canals. In addition, significant features associated with Guevavi, including a possible earlier church and prehistoric Early Agricultural Period sites, were identified outside the National Park Service parcel. The recorded features at Calabazas include remains of the church and compound, a rowhouse, other possible structural remains, a large depression, a ditch, and two bedrock mortar outcrops. There is little documented use of the three units by contemporary Native American groups, however some groups were photographed taking part in a religious festival at the Tumacácori mission in the 1940's as part of Easter celebrations. No Native Americans were present or occupying any of the three sites after 1848 when the last O'odham left San Jose de Tumacácori.

REGULATIONS AND POLICIES

Section 106 of the National Historic Preservation Act (16 United States Code 470 *et seq.*), requires the consideration of impacts on historic properties that are listed, or eligible to be listed in the National Register of Historic Places. Federal agencies are required to coordinate consultation with State Historic Preservation Officers regarding the potential effects to the properties (NPS 2006).

According to National Park Service *Management Policies 2006* (NPS 2006), Director's Order #28 – *Cultural Resource Management Guideline* and #28A – *Archeology*, and the mission of the National Park Service, the park system units are charged with preserving cultural resources as elements of our national heritage for the benefit and enjoyment of present and future generations.

Applicable laws and policies include the National Historic Preservation Act; Executive Order 11593; Archeological and Historic Preservation Act; Archeological Resources Protection Act; the Secretary

of the Interior's Standards and Guidelines for Archeology and Historic Preservation; Programmatic Memorandum of Agreement Among the NPS, Advisory Council on Historic Preservation, and the National Council of State Historic Preservation Officers (1995); NPS Management Policies, 2006.

Table 8. Archeological Resources Impact Intensity Thresholds

Impact Topic	Negligible	Minor	Moderate	Major	Duration of Impact
Archeological Resources	Impact is at the lowest levels of detection--barely measurable, with no perceptible consequences, either adverse or beneficial, to archeological resources. For purposes of §106, the determination of effect would be no adverse effect.	Adverse: disturbance of a site(s) results in little, if any; loss of significance or integrity and the National Register eligibility of the site(s) is unaffected. For purposes of Section 106, the determination of effect would be no adverse effect. Beneficial: maintenance preservation of a site(s). For purposes of Section 106, the determination of effect would be no adverse effect.	Adverse: disturbance of a site(s) does not diminish the significance or integrity of the site(s) to the extent that its National Register eligibility is jeopardized. For purposes of Section 106, the determination of effect would be adverse effect. Beneficial: stabilization of the site(s). For purposes of section 106, the determination of effect would be no adverse effect.	Adverse: disturbance of a site(s) diminishes the significance and integrity of the site(s) to the extent that it is no longer eligible to be listed in the National Register. For purposes of Section 106, the determination of effect would be adverse effect. Beneficial: stabilization of the site(s). for purposes of section 106, the determination of effect would be no adverse effect	All impacts would be permanent.

IMPACTS OF THE NO-ACTION ALTERNATIVE

Under the no-action alternative there would be no fuels treatments, such as thinning, prescribed fire, or other treatments, increasing the risk of damage from a wildfire. Herbicides and a minimal amount of pile burning would still be permitted under the park's invasive plant management plan.

The no-action alternative would have the potential to adversely affect archeological resources. Fire effects on archeological resources vary depending on temperature and duration of exposure to heat. Archeological resources that are scattered throughout the park would be at risk from wildfires, although fires are not particularly common at the park. Potential impacts on archeological resources from wildfire could include cracking, charring, sooting, combustive residue, fracture, scorching, and melting (Ryan et al. 2012, Sturtevant 2011). Buried resources are insulated by the soil (Oster et al. 2012). Heat from even very intense fires rarely penetrates more than eight inches into the soil; temperatures in the soil at two inches may reach 300F (Certini 2005). The buildup of fuels could increase the potential for fire damage and may present an elevated threat to archeological resources (see Oster et al. 2012).

During wildland fire suppression activities, known archeological sites, and features, such as walls and scattered or buried artifacts, would be avoided and protected; and archeologists would monitor any

ground disturbing activities. Protection of these areas is of paramount importance in the event of a fire. Planning strategies would ensure that adequate firefighting resources are available to safeguard archeological sites while firefighting is done to prevent additional resource damage. However, in an emergency situation, some inadvertent damage could occur from firefighters with hand tools clearing a firebreak, or from driving rubber-tired fire vehicles. Mitigations are in place to try to prevent resource damage in the unlikely event of a fire retardant drop or from ground-disturbing activities. In case of a severe fire, burned area stabilization or restoration treatments could be used to protect archeological sites or to mitigate damage. These would be done with coordination with and under the guidance of an archeologist. Impacts on archeological resources from the no-action alternative would be long-term, site-specific, direct and indirect, minor, and adverse.

Cumulative Impacts

Other actions within the park potentially impacting archeological resources are proposed new trails and visitor facilities and increased visitor use. The no-action alternative may result in potentially more severe fire behavior and increased fire suppression actions, which could negatively impact archeological resources. When combined with other past, present, and reasonably foreseeable future actions, the no-action alternative would be expected to provide a negligible contribution to the overall cumulative impacts on archeological resources.

Conclusion

The no-action alternative could result in indirect, negligible to minor, site-specific, long-term adverse impacts on archeological resources resulting from wildfires and associated fire suppression activities.

IMPACTS OF THE PREFERRED ALTERNATIVE

Mechanical fuel reduction treatments, prescribed burning, and pile burning can directly impact archeological resources, depending upon their location and type. Ground-disturbing treatments are more likely to impact archeological resources than chemical treatments and could directly result in adverse impacts on surface and subsurface scatter (Winthrop 2004). Standard park mitigations require that site-specific surveys be conducted before any ground disturbance takes place ensure that impacts are minimized, and important resources are avoided as much as possible. Soil is a good insulator, so treatments using fire, even pile burning, should have minimal impact on buried resources (see Oster et al. 2012). During all mechanical fuel reduction treatments, known archeological sites, and features, such as the church ruins, walls, and buried and scattered artifacts, would be avoided and protected; and archeologists would monitor any ground disturbing activities. To help protect buried archeological resources, large piles will not be burned in areas where resources are located.

All archeological resources could benefit from implementation of mechanical fuel reduction treatments that would lessen the potential for damage from wildfires that could cause cracking, charring, sooting, combustive residue, fracture, scorching, and melting (Ryan et al. 2012, Sturtevant 2011) in fire-susceptible archeological sites. The preferred alternative may also reduce the need for fire suppression actions on park property or to protect adjacent private property, especially with the existence of a fuel break adjacent to homes. Impacts from the preferred alternative would be indirect, local, minor, long-term, and beneficial.

Cumulative Impacts

When combined with other past, present, and reasonably foreseeable future actions, the preferred alternative would be expected to provide a minor decrease to the overall negative cumulative impacts on archeological resources.

Conclusion

Archeological resources would benefit from implementation of mechanical fuel reduction treatments, prescribed burning, and pile burning, which would lessen the potential for wildfires that could damage or destroy fire-susceptible archeological sites in the future, as well as lessening the potential for damage during fire suppression actions. This should generally result in improved protection for these resources. Impacts of the preferred alternative would be indirect, local, minor, long-term, and beneficial and would contribute to a minor decrease to the overall negative cumulative impacts.

Section 106 Summary

Section 106 consultation has been initiated with the Arizona State Historic Preservation Officer. This environmental assessment will be sent to the State Historic Preservation Office for review and comment which would partially complete Section 106 compliance. Government-to-government consultation with American Indian tribes will be initiated to ensure no adverse impacts to ethnographic resources and values.

This environmental assessment analyzed the potential impacts associated with implementation of two alternatives: the no-action and preferred alternatives. The environmental assessment proposes mitigation measures to avoid adverse effects on cultural resources. This project is at the plan level, and site-specific consultation will be completed. The adaptive management approach proposed under the preferred alternative commits the National Park Service to continued consultation with interested tribes, stakeholders, and the State Historic Preservation Office.

Pursuant to 36CFR800.5 (these regulations implement the National Historic Preservation Act and address the criteria of effect and adverse effect) the National Park Service finds that implementation of the types of projects and mitigation measures in the fire management plan for Tumacácori Historical Park would result in a “no adverse effect” determination for archeological resources eligible for or listed on the National Register of Historic Places. Project-specific compliance with Section 106 of the National Historic Preservation Act will be accomplished under the standards and process identified in the NPS Nationwide Programmatic Agreement (2008).

HISTORIC STRUCTURES

AFFECTED ENVIRONMENT

Tumacácori National Historical Park protects and preserves three Spanish colonial mission ruins in southern Arizona: Tumacácori, Guevavi, and Calabazas. The park’s primary resource is the mission church of San Jose de Tumacácori. The Tumacácori National Historical Park visitor center, the Calabazas Church Ruin, and the Guevavi Church Ruin are listed by the National Park Service as Classified Historic Structures. The Visitor Center is also registered as a National Historic Landmark and is on the National Register of Historic Places (NRHP).

The mission of Los Santos Ángeles de Guevavi (Guevavi) was the first *cabecera* (head church with a resident Father) established in Arizona, with San José de Tumacácori established simultaneously as a *visita* (frequently visited satellite mission without a resident Father). San Cayetano de Calabazas was established 50 years later as another *visita* to Guevavi. Calabazas and Guevavi are vernacular and designed landscapes associated with the Spanish colonial mission era, located beside one of the only riparian corridors in the region, the Santa Cruz River. (Vernacular means of, or relating to, the common style of a particular time, place, or group of people.) Table 9 is the park’s List of Classified Structures.

Areas immediately around these structures are maintained largely vegetation-free as normal maintenance and preservation work. Fire-related fuel reduction work is done at a moderate distance from these structures.

Table 9. List of Classified Structures

Structure Number	Preferred Structure Name	Significance
BL001	Visitor Center	National
BL003	Comfort Station	Contributing
GR003	Museum Garden	Contributing
GR005	Adobe Perimeter Walls	Contributing
HS001	Residence #1	Contributing
HS002	Residence #2	Contributing
RU001	Mission Church	Contributing
RU002	Convento	Contributing
RU003A	Campo Santo Walls	Contributing
RU003B	Granary	Contributing
RU004	Mortuary Chapel	Contributing
RU007	Lime Kiln	Contributing
RU009	Calabazas Church Ruin	National
RU010	Guevavi Church Ruin	National
RU012	Cisterns	Contributing
RU013	Calabazas Compound Walls	Contributing
RU014	Historic Acequia	Contributing

REGULATIONS AND POLICIES

Section 106 of the National Historic Preservation Act (16 United States Code 470 *et seq.*), requires the consideration of impacts on historic properties that are listed, or eligible to be listed, in the National Register of Historic Places. Federal agencies are required to coordinate consultation with State Historic Preservation Officers regarding the potential effects to the properties (NPS 2006).

According to National Park Service *Management Policies 2006* (NPS 2006), Director’s Order #28 – *Cultural Resource Management Guideline* and #28A – *Archeology*, and the mission of the National Park Service, the park system units are charged with preserving cultural resources as elements of our national heritage for the benefit and enjoyment of present and future generations. Impact intensity thresholds are described below.

Applicable laws and policies include the National Historic Preservation Act; Executive Order 11593; Archeological and Historic Preservation Act; the Secretary of the Interior’s Standards and Guidelines

for Archeology and Historic Preservation; Programmatic Memorandum of Agreement Among the NPS, Advisory Council on Historic Preservation, and the National Council of State Historic Preservation Officers (1995); NPS Management Policies, 2006.

Table 10. Historic Structures Impact Intensity Thresholds

Impact Topic	Negligible	Minor	Moderate	Major	Duration of Impact
Historic Structures	Impact is at the lowest levels of detection--barely measurable, with no perceptible consequences, either adverse or beneficial, to archeological resources. For purposes of §106, the determination of effect would be no adverse effect.	Adverse: disturbance of a site(s) results in little, if any; loss of significance or integrity and the National Register eligibility of the site(s) is unaffected. For purposes of Section 106, the determination of effect would be no adverse effect. Beneficial: maintenance preservation of a site(s). For purposes of Section 106, the determination of effect would be no adverse effect.	Adverse: disturbance of a site(s) does not diminish the significance or integrity of the site(s) to the extent that its National Register eligibility is jeopardized. For purposes of Section 106, the determination of effect would be adverse effect. Beneficial: stabilization of the site(s). For purposes of section 106, the determination of effect would be no adverse effect.	Adverse: disturbance of a site(s) diminishes the significance and integrity of the site(s) to the extent that it is no longer eligible to be listed in the National Register. For purposes of Section 106, the determination of effect would be adverse effect. Beneficial: stabilization of the site(s). For purposes of section 106, the determination of effect would be no adverse effect.	All impacts would be permanent.

IMPACTS OF THE NO-ACTION ALTERNATIVE

Under the no-action alternative there would be no hazardous fuel treatments, such as thinning activities, prescribed fire, pile burning, and other treatments, increasing the risk from damage from a wildfire. (Herbicides and pile burning for invasive species treatment would still be permitted under the park's invasive plant management plan.)

The no-action alternative would have the potential to impact historic structures because of increased potential for intense wildfires. Ignition of structures depends on the flammability of the structure, proximity of the fire, and intensity and duration of the fire (Cohen 2000). Most buildings are of non-flammable construction and in a well maintained landscape. Potentially only the mission at Guevavi might be close enough to vegetation to be impacted by heat, but damage should be minimal because the structure is made of adobe (see Haecker 2012). Smoke staining is possible on some structures. Embers blown in on the wind can ignite external wooden components (Haecker 2012), such as lintels around doors or windows, which are present on several of the classified structures. Embers are mostly a problem where structures have flammable roofs and insufficient clearance from vegetation (often cited as being about 30 feet)(Cohen 2000, Foote et al. 2011), but the structures at

the park have non-flammable, well maintained roofs and good clearance. Impacts from wildfire damage could be long-term, site specific, direct, minor, and adverse.

Protection of these areas is of paramount importance in the event of a fire. Planning strategies would ensure that adequate firefighting resources are available to safeguard historic structures while firefighting tactics are utilized to prevent additional resource damage. Impacts from fire suppression actions are unlikely because the vegetation is sparse adjacent to historic structures. In the unlikely event of a retardant drop, these structures would be avoided. Impacts from wildfire suppression damage to the historic structures are anticipated to be negligible.

Cumulative Impacts

Actions affecting historic structures include the restoration work that would be conducted under the General Management Plan. The no-action alternative may result in more severe fire behavior, slightly increasing the potential for impact to historic structures. When combined with other past, present, and reasonably foreseeable future actions, the no-action alternative would be expected to provide a negligible contribution to the overall beneficial cumulative impacts on historic structures.

Conclusion

Historic structures could potentially be damaged from wildfire management responses. Impacts on historic structures could be long-term, site specific, direct, minor, and adverse. Contributions to cumulative effects are negligible.

IMPACTS OF THE PREFERRED ALTERNATIVE

Historic structures, such as the missions, could benefit from implementation of mechanical fuel reduction treatments and prescribed burning that would lessen the potential for intense wildfires that can affect fire-susceptible historic structures. During all mechanical fuel reduction treatments, known historical structures, such as the church, ruins, walls, and others listed in Table 8, would be avoided and protected. Impacts from prescribed burning will be avoided by planning that includes consideration for these structures. The main way to control prescribed fire impacts (including pile burning) is to not burn near these structures, and to burn with lower intensities that would avoid smoke or ember impacts. Effects from the treatment activities themselves on historic structures would be negligible.

Wildfires and fire suppression actions do have the potential to impact historic structures, but fuel reduction treatments will lessen this threat. Potential impacts could be similar to the no-action alternative but much less likely. The impact from reduced potential from damaging fire behavior is anticipated to be long-term, site specific, indirect, minor, and beneficial.

Cumulative Impacts

When combined with other past, present, and reasonably foreseeable future actions, the preferred action alternative would be expected to provide a negligible increase to the overall beneficial cumulative impacts on historic structures.

Conclusion

Historic structures would benefit from implementation of mechanical fuel reduction treatments, prescribed burning, and pile burning that would lessen the potential for wildfires that could damage or destroy fire-susceptible structures. Impacts on historic structures would be long-term, site specific, indirect, minor, and beneficial. Contributions to cumulative impacts are negligible.

Section 106 Summary

Section 106 consultation has been initiated with the Arizona State Historic Preservation Officer. This environmental assessment will be sent to the State Historic Preservation Office for review and comment which would partially complete Section 106 compliance. Government-to-government consultation with American Indian tribes will be initiated to ensure no adverse impacts to ethnographic resources and values.

This environmental assessment analyzed the potential impacts associated with implementation of two alternatives: the no-action and preferred alternatives. The environmental assessment proposes mitigation measures to avoid adverse effects on cultural resources. This project is at the plan level, and site-specific consultation will be completed. The adaptive management approach proposed under the preferred alternative commits the National Park Service to continued consultation with interested tribes, stakeholders, and the State Historic Preservation Office.

Pursuant to 36CFR800.5 (these regulations implement the National Historic Preservation Act and address the criteria of effect and adverse effect) the National Park Service finds that implementation of the types of projects and mitigation measures in the fire management plan for Tumacácori National Historical Park would result in a “no adverse effect” determination for historic structures eligible for or listed on the National Register of Historic Places. Project-specific compliance with Section 106 of the National Historic Preservation Act will be accomplished under the standards and process identified in the NPS Nationwide Programmatic Agreement (2008).

CHAPTER 4: CONSULTATION/COORDINATION

INTERNAL SCOPING

Scoping is a process to identify the resources that may be affected by a project proposal, and to explore possible alternative ways of achieving the proposal while minimizing adverse impacts. Internal scoping was conducted by an interdisciplinary team of professionals from Tumacácori National Historic Park. Interdisciplinary team members met on November 11, 2010 to discuss the purpose and need for the project; various alternative elements; potential environmental impacts; past, present, and reasonably foreseeable projects that may have cumulative effects; and potential mitigation measures. The team also gathered background information and discussed public scoping for the project. Team members conducted several site visits to view and evaluate the proposed project areas.

PUBLIC SCOPING

Public scoping was initiated with the distribution of a scoping letter to inform the public of the proposal to develop a new Fire Management Plan, and to generate input on the preparation of this environmental assessment. The scoping letter dated March 15, 2011 was mailed to interested parties on the park's mailing list, and various federal and state agencies. The press release was posted on the NPS Planning, Environment, and Public Comment (PEPC) website. Additionally, the park hosted a public scoping open house on April 6, 2011, at the park.

The public scoping period started on March 15, 2011, and ended on April 25, 2011. During the scoping period, NPS received two pieces of correspondence; one was received from the City of Nogales Fire Department, and one was received from the Pascua Yuqui Tribe. Both of these pieces of correspondence indicated support of the process to produce a new Fire Management Plan, and the Pascua Yuqui Tribe requested that the environmental assessment be sent to four additional individuals.

AGENCY CONSULTATION

Endangered Species Act

In accordance with the Endangered Species Act, NPS contacted the U.S. Fish and Wildlife Service (FWS) with regards to federally listed special status species. FWS directed NPS to a current species list which was used in preparation of this environmental assessment. The NPS received a letter from USFWS directing the agency to restrict all fuels project work to the months of April and October (USFWS 2013), which has been incorporated into this document.

Section 106 of the National Historic Preservation Act

In accordance with Section 106 of the National Historic Preservation Act, NPS provided the Arizona State Historic Preservation Office (SHPO) an opportunity to comment on the effects of this project on historic properties. A scoping letter and a telephone conversation between NPS and SHPO to discuss this combined Environmental Assessment/Assessment of Effect document. The combined document determines that the Fire Management Plan would have *no adverse effect to historic properties*, and site-specific project consultation will be completed either via the standard process, or the process identified in the NPS Nationwide Programmatic Agreement (2008). The NPS will submit this document to SHPO for review, and awaits their response.

NATIVE AMERICAN CONSULTATION

NPS contacted the following two Native American tribes at the beginning of this project to determine if there were any ethnographic resources in the project area and if they wanted to be involved in the environmental compliance process:

- Tohono O'odham Nation
- Pascua Yaqui Tribe

NPS received one response from the Pascua Yaqui Tribe. The EA will be sent to both of the tribes during the public review period for their review and comments.

ENVIRONMENTAL ASSESSMENT REVIEW AND LIST OF RECIPIENTS

The EA is subject to a 30-day public comment period. To inform the public of the availability of the EA, the NPS will publish a distribute a letter to various agencies, tribes, and the park's mailing list, as well as place and ad in the local newspaper. The document will be available for review on the PEPC website at [http://\[arl\];ammomg.nps.gov/tuma](http://[arl];ammomg.nps.gov/tuma) and at the park's visitor center. Copies of the EA will be provided to interested individuals, upon request.

During the 30-day public review period, the public is encouraged to submit their written comments to NPS, as described in the instructions at the beginning of this document. Following the close of the comment period, all public comments will be reviewed and analyzed, prior to the release of a decision document. NPS will issue responses to substantive comments received during the public comment period, and will make appropriate changes to the EA, as needed.

LIST OF PREPARERS

The following persons assisted with the preparation of this EA.

Table 11. Document Preparers

Name	Role on Project	Title
National Park Service		
Kevin Parrish	Project Coordinator	Fuels Specialist
Bob Love	Project Information, Reviewer	Superintendent
Jeremy Moss	Natural and Cultural Resources Consultation	Chief of Resource Management
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Michele Girard	Technical Reviewer	Ecologist
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URS Corporation		
Leslie Watson	Co-Project Manager	Project Manager
Keith Pohs	Co-Project Manager, Technical Writer-Editor, Resources, Contributing Author	Senior Environmental Planner
David Konopka	Resources, Contributing Author	Environmental Planner
Allison Getty	Resources, Contributing Author	Environmental Planner

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